August 1995

To The Graduate Council:

I am submitting herewith a dissertation written by Bing Yao entitled "Identification of Benchmark Practices for an Apprenticeship System for Young Adults." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Clifton P. Campbell, Major Professor

We have read this dissertation and recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor
and Dean of The Graduate School

IDENTIFICATION OF BENCHMARK PRACTICES FOR AN APPRENTICESHIP SYSTEM FOR YOUNG ADULTS

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Bing Yao

August 1995

This dissertation is dedicated to my parents,

Fugen (富根) and Qinfang (琴芳)

ACKNOWLEDGMENTS

The author acknowledges his debt of appreciation to all the individuals who helped and supported him, directly or indirectly, in completing this dissertation.

An extreme amount of gratitude is extended to Dr. Clifton Campbell, chair of the author's doctoral committee, for his constant guidance, inspiration, and encouragement. While shepherding the author with scholarly rigor through the arduous task of planning and conducting the study, Dr. Campbell never failed to exhibit enough faith and patience. To the author, he was both an unlimited source of knowledge and an exemplary mark of direction.

A very special note of thanks is due Dr. Gerald Cheek, who was another member of the committee. Dr. Cheek was instrumental in the author's selection of the dissertation topic. He also made available to the author a precious opportunity to participate in an international study tour to Switzerland and Germany. His brilliant ideas, perceptive advice, constructive critiques, and "hands-on" assistance, which were all offered on a timely and continuous basis, greatly helped the author in transforming his initial ideas into a completed piece of research.

The author also wishes to express his heartfelt gratitude to a third member on the committee, Dr. Schuyler Huck. While encouraging the author to examine and challenge any questionable arguments and conclusions, Dr. Huck made every effort to ensure that the research was a creative and intellectual endeavor. His wise, insightful comments on the author's research conception and design as well as his sincere trust were too invaluable for the author to over-appreciate.

Further, the author was particularly privileged to have Dr. Robert Maddox on the committee. Dr. Maddox was always ready to do whatever was necessary to help make the

dissertation as good as possible. It is due to his extraordinary talent, professional expertise, and enthusiastic support that this dissertation has reached fruition.

The committee as a whole read more than every word of the author's work and provided hundreds of helpful suggestions. Without their careful reviewing, this dissertation could have been completed in half the time but would also have been about one third as good.

The author is also indebted to Mrs. Linda Campbell and Mrs. Judy Johnson for their valuable assistance in proofreading all the chapters. Not only did they look over the text for inappropriately used words and expressions, but they helped point out style inconsistencies, grammatical errors, misplaced punctuation marks, confusing jargon, and other such things.

In addition, special tribute is paid to the critical contributions made by the Delphi panel members in developing the Tennessee Model of Apprenticeship for Young Adults. These fine subject matter experts participated in the Delphi study willingly and actively and offered innovative, realistic answers to many important questions.

Finally, the author would like to thank his wife Min Zhang, who provided love, comfort, and encouragement during his seemingly endless days and nights of plodding through the work.

ABSTRACT

The purpose of this study was twofold: (a) to identify the benchmark practices for an apprenticeship system for young adults through collection and analysis of expert opinions about a tentative Tennessee Model of Apprenticeship for Young Adults and (b) to investigate how the finalized Tennessee Model of Apprenticeship for Young Adults, which was created on the basis of the expert-identified benchmark practices, would be perceived by different groups of major stakeholders. For the first purpose, a Delphi procedure was utilized. For the second, quantitative methodologies were adopted.

The tentative model was developed by the researcher as a result of his literature review, visits to apprenticeship training establishments, interviews with experts in apprenticeship, and a study tour to Switzerland and Germany. Expert opinions about this tentative model were then elicited from a Delphi panel. During the Delphi procedure, a total of 86 changes were suggested. The tentative model was revised on the basis of the panel members' consensual opinions about the suggested changes. After three rounds of questionnaires, the model was finalized. It was then proposed to the Tennessee Council on Vocational Education. The major themes of the model included (a) training of skilled workers for a productive workforce, (b) combination of employer-provided on-the-job training with school-based instruction, (c) integration of academic and vocational education, and (d) transition of young adults from secondary school to work.

Major stakeholders who will participate in and/or have direct, critical impact on the development and implementation of an apprenticeship system for young adults were defined as the four groups of people in the state of Tennessee: (a) presidents or chief executive officers in businesses, (b) labor union officials, (c) relevant governmental officials, and (d) directors of vocational education organizations and programs. Fifty

subjects were randomly selected from each group, and an executive summary of the finalized Tennessee Model of Apprenticeship for Young Adults, along with a survey questionnaire, was mailed to each selected subject. The subjects were asked to read the summary and then rate completeness, effectiveness, and implementability of the model on a 7-point Likert-type scale ranging in the descending order from 7 (strongly agree) to 1 (strongly disagree).

Descriptive statistics showed that all the median ratings were 4.0 or above except for that by the group Labor Union Officials about implementability (3.5) of the model. The mean ratings were all above 4.0 except for those by the group Labor Union Officials about effectiveness (3.5) and implementability (3.4). In general, the groups Relevant Governmental Officials and Directors of Vocational Education Organizations and Programs were the most positive in their median and mean ratings about completeness, effectiveness, and implementability of the model, and the group Labor Union Officials was the least positive.

The results of three one-way analyses of variance indicated that there were statistically significant differences in the mean ratings among the four groups of respondents (stakeholders) on all of the three dependent variables--completeness, effectiveness, and implementability of the model. The results of three Duncan's new multiple range tests further revealed that on all three dependent variables, the difference between the mean of the group Labor Union Officials and the means of all the other three groups was large enough to be statistically significant. No other differences were significant.

A major conclusion was that the Tennessee Model of Apprenticeship for Young Adults was, on the whole, perceived favorably by major stakeholders. It was thus a good

indication of potential success in the development and implementation of an apprenticeship system that incorporates the expert-identified benchmark practices contained in the model.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

The long-term economic growth and competitiveness of a nation depends largely on the quality of its workforce. A steady stream of highly skilled workers is increasingly the outcome of a nation's well-organized and effective workforce education and training system. In the United States, however, "there is growing concern that America's current education and training efforts have not [met] and cannot meet the challenge and demands of producing an internationally competitive workforce" (Campbell & Armstrong, 1993, p. 1). The need for more effective workforce training and skill development has become a popular cry of America's businesses and policy makers.

A large number of remedies have been prescribed over the past decade for the perceived inadequacy of America's educational system. Although they do not always agree in details, most of the remedies have two recommendations in common: (a) raising the standards of school achievement and (b) promoting excellence in schooling. The basic assumption underlying the majority of the national reports and other important publications on educational reform seems to be that the requirements for a productive and competitive workforce in the contemporary world can be adequately met as long as a nation's school-based educational and curricular systems are improved.

This assumption is, nevertheless, not beyond challenge. It is now recognized by many informed workforce training professionals that school-based education alone is neither sufficient nor appropriate for the development of the skilled workforce needed by a

nation in its participation in global economic competition. The integration of workplace training with school-based vocational and academic education has, therefore, been proposed as a promising approach to the quality preparation of American young people for both today's and future work. A well-designed apprenticeship system for young adults may, according to those informed professionals, adequately represent such integration.

The purposes of this study were to (a) identify the benchmark practices for an apprenticeship system for young adults through collection and analysis of expert opinions about a tentative Tennessee Model of Apprenticeship for Young Adults and (b) explore the perceptions of different groups of stakeholders about the finalized Tennessee Model of Apprenticeship for Young Adults, which was developed on the basis of the expert-identified benchmark practices.

Rationale of the Study

International economic competition and rapid technological improvement in today's world have caused a grave concern in the United States about the quality of the American workforce. Many other countries that once produced inferior commodities with higher production costs are now manufacturing higher-quality, lower-priced products. While those industrialized nations "have experienced enormous advancements in productivity, and have gained added shares in the global economy" (Campbell & Armstrong, 1993, p. 1), the United States has been losing its competitive edge and global market share.

It now takes 3 years to achieve the same productivity improvement that the United States used to achieve in 1 year 2 decades ago (Commission on the Skills of the American Workforce, 1990, p. 19). Meanwhile, the impact of technological improvement is forcing

the American economy to shift from a manufacturing base toward a service one and from labor-intensive to knowledge-intensive industries. Skills required for most manufacturing jobs have increased (Cappelli, 1991a). The types of low-skill but high-paying jobs that once provided good employment for American workers have largely disappeared. As a result, belief is now widespread that America's workforce is "unready for the new jobs, unready for the new realities, unready for the new challenges of the nineties" (Dole, 1989, p. 1).

Because the United States has, in recent times, not been able to compete favorably against other industrialized nations in many aspects of the economic arena, it is now commonly believed that the quality of the American workforce has been decaying. With the extensive adoption of modern technologies in the workplace, the vast majority of America's youth are now considered to be ill-equipped with the knowledge and skills necessary for today's increasingly complex occupations. Plaintive cries from American employers have been consistent: Our young workers are ill-educated, lack job-related skills, and cannot think (Filipczak, 1992, p. 23). The United States is said to be facing an impending "workforce crisis."

The reasons for America's ebbing economic leadership may be multiple. However, without a well-educated and highly-skilled workforce, the United States cannot expect to maintain its former competitive edge in the world economy. For the United States to halt its decline in the global economic competition, improving the education and training of the nation's workforce must become a national priority (Cheek, 1993, p. 8). "The future of the U.S. economy, productivity, and global competitiveness depends on the Nation's ability to prepare and maintain a well-qualified workforce" (Campbell & Armstrong, 1993, p. 1).

While it may be argued that improving the academic achievements of high school students does not necessarily guarantee the betterment of a nation's economic productivity and competitiveness, it is evident that such achievements are highly necessary conditions. A good command of the basic knowledge and skills in reading, writing, mathematics, and science is essential to the high productivity of a workforce. Without adequate academic skills, acquisition of modern occupational skills is often out of the question.

Nevertheless, the overall academic achievements of American high school students are now adjudged far from adequate for today's workplace needs and "compare unfavorably with the achievements of students in most of the countries that are our economic competitors" (Passmore, 1994, p. 24). "The educational performance of those students who become front-line workers in this country is well below the average performance of their counterparts in some newly industrializing low wage countries" (Commission on the Skills of the American Workforce, 1990, p. 43). If it is true that "a majority of high school seniors cannot even calculate their own lunch bills or write letters to seek employment" (Passmore, 1994, p. 24) and that 95% of young high school graduates cannot estimate costs using grocery unit-price labels (Barton & Kirsch, 1990, pp. 9-10), the chances are slim that those youngsters will be able to adapt to and survive in modern work environments in which technological advancement is ever accelerating.

Positive work behaviors, such as showing up regularly and on time for work, are also found missing among a considerable number of American youth. Many young people are regarded as incapable of working effectively without close supervision. Dedication to work and discipline in work habits are the biggest deficits that most employers see in high school graduates who are applying for jobs (Cappelli, 1991b, p. 5). Employer survey results often indicate that American young workers do not strive to work hard and are not able to communicate, set priorities, work with others, and learn how to learn (Barton &

Kirsch, 1990, pp. 17-18). American businesses are not in a position to compete successfully in the global market if their employees do not possess the basic work virtues.

Schools are ordinarily expected to have taught young people basic academic knowledge and skills as well as work virtues prior to graduating them from high school (Secretary's Commission on Achieving Necessary Skills, 1991). Since schools are not turning out students whose knowledge, skills, and work attitudes meet industry's requirements for a productive workforce, a typical indictment from the latter is that "American schools are flunking the job of education of the work force" (Bureau of Labor and Management Relations, 1989, p. 10). For the generally recognized deterioration of the current American workforce, schools are reproached, teachers are blamed, and school curricula are criticized.

To help schools realize the importance of the needs of the ever-changing industrial workplace, many opinions regarding what and how schools are supposed to teach have been aired. A variety of studies have been published that summarize and present employers' expectations of entry-level workers (Passmore, 1994). Serious attempts have been made by business and industry to convince schools that what American students are learning in the schoolhouse is not only inadequate but antiquated as well. For the survival and prosperity of both American young people and the nation's economy, school curricula must be reformed, and standards of academic achievement have to be raised.

To such an accusation from business and industry, there have been primarily two types of responses from schools. First, the major goals of American public education should be intellectual, social, and personal, but not vocational. Therefore, the workforce problem should be dealt with not by schools but by industry itself. Second, the workforce deficiency is a problem that is deeply rooted in the American socio-economic structure; education is not in a position to address it.

The first type of response is shared by a large number of educational policy makers, educational and curricular theorists, and teachers. Among these people, the call for the nation's economic well-being has largely fallen on deaf ears. It is, in fact, often interpreted as merely "crying wolf." The fact that the vast majority of American young adults do not have opportunities to enter career-level employment should not, in the opinions of those people, interfere with the "loftier" goals for education. Educational goals and school curricula must not be decided by profit-making employers.

With the existence of a plethora of goals, the debate over what should be the major ones for American public education has, of course, never been conclusive. Many policy makers, theorists, and teachers advocate intellectual and cognitive development as the major goal. Quite a few favor the notion of social improvement. Some argue for personal actualization. Amidst this diversity of goals for education, however, the vocational goal has never been included as a lofty one in this endless dispute. To many people involved in education, it is degrading if a major goal for American public schools is to prepare young people for "non-professional" work.

While those people take pride in their own philosophies and values about education, they are ordinarily viewed as educational elitists by people with contrasting perspectives. Elitists invariably invert the hierarchy of human needs, placing the most fundamental ones in the least important position. They exclusively value non-vocational book learning and have disdain for any real-life, hands-on learning experiences for work. Elitists firmly believe that school should be only for schooling's sake (Evans, 1968, p. 189). Preparing students for college is all that secondary schools should do even though most of the jobs available on the labor market will not require a college degree. The elitist points of view about school education are criticized as "both undemocratic and unrealistic" (Cheek & Campbell, 1994, p. 115).

The elitist thinking has largely determined the unfavorable conditions for vocational education in American public schools. Resources are allocated "disproportionately in favor of liberal education" (Cheek & Campbell, 1994, p. 115). Funding for vocational education has been continuously decreasing. The non-college-bound pathway is, by design, closely associated with failure. Students who choose or are placed in the vocational track do not receive the type of education that they are rightfully entitled to as citizens. The image, status, and quality of American vocational education are seriously jeopardized for its being widely utilized as a ground where low academic achievers, troublemakers, and special-needs students are conveniently "dumped." Vocational education has become a versatile synonym for dropout prevention, teenage pregnancy education, drug abuse rehabilitation, among many others. Given such deplorable conditions, it is only natural for American vocational education to fail to achieve the basic mission that it is expected to achieve, that is, training young adults for gainful and productive employment.

Elitists cherish their inveterate belief that "non-professional" work, which is not among their "lofty" goals for public education, is meant only for those who have failed in school and should occur only when unsuccessful schooling has been completed. They simply ignore the fact that the American educational system has continued to turn out vast numbers of high school graduates who are woefully unprepared to meet the needs of today's workforce. Their basic defending argument is that training "non-professional" workers for the nation's economic well-being is not a secondary school's business.

The second type of response comes from a second type of people who admit that adequately preparing young adults to meet the requirements for the workforce should be an indispensable and important goal for public education. However, they adopt a pessimistic view about the possibility for public education to achieve that goal in the

existing social and economic structures in the United States. Schools are, these people would argue, already doing the best they can, but social problems cannot be solved by education. While poor education does deteriorate the American workforce, it is not the root cause. The fundamental problem is in the American capitalist structure. In short, those people deem it unlikely that public schools can make constructive contributions in dealing with the workforce problem.

Non-college-bound youth in the United States are, in the opinions of the second type of people, well aware that they will invariably be regarded as immature by American employers until the "magic age" of 25 or even 30. It is unlikely that the knowledge and skills they acquire in schools will ever be recognized and utilized. The chances for high school graduates to be employed in skilled occupations in the primary labor market have become too slim for them to be motivated to learn in schools. American high school students not bound for college know that attending school does not lead to a qualified-worker status or to any better economic prospects. "Many employers require a high-school diploma for all new hires, yet very few believe that the diploma indicates educational achievement" (Commission on the Skills of the American Workforce, 1990, p. 24). The fact that a high school diploma is now, in many situations, worth nothing more than the price of the piece of paper has destroyed students' learning motives. Despite the widespread implementation of school-based educational reforms, high school dropout rates have actually increased over the years (Cremin, 1989).

The second type of people maintain that American schools have not been successful in preparing non-college-bound youth for work not simply because schools have low standards and weak curricula but mainly because these young adults do not have any authentic goals for learning and cannot relate any bright future to their schooling. Students "are reluctant to work hard in school unless they perceive a link between

schoolwork and their future occupational success" (Lerman & Pouncy, 1990a, p. 71). Any educational or curricular reform that strives for academic excellence or authentic learning in schools is at the least very ineffective if not doomed to failure, unless students have genuine goals for such learning.

According to the second type of people, the goals created by schools for non-college-bound students are generally viewed by students as "phony." No matter how competent teachers are, they are capable of little when faced with a huge number of school-weary students who remain in the classroom simply because of compulsory education. "Most teachers are eager to find ways to motivate their students, but they often lack authority to accomplish this" (Rosenbaum, 1992, p. 3). While it should be the responsibility of schools to produce high school graduates who are well-prepared for the requirements for the workforce, it is unfair to blame only schools for the current workforce predicament. The nation's economic problem could well be due to various blunders in business administration. The policy of not training and employing high school graduates for high-skill, decent-paying occupations is one of them. American employers' unwillingness to take a chance on non-college-bound youth is the root cause of the decay of the workforce quality.

Elitist educational practices and employers' discriminative training and employment policies are, in actuality, both significantly related to the fact that America's non-college-bound youth are not motivated to strive for good achievements in school. Today's public education in the United States is irrelevant to non-college-bound young people and their employers. The American educational system "has ignored the right of every citizen to obtain an education for the purpose of experiencing life and preparing for what comes next" (Cheek & Campbell, 1994, p. 115). Likewise, while claiming a well-educated, highly-skilled, and mature workforce, American employers have entirely

disregarded young people's primary needs for occupational skills, a chance to mature among adult workers, a promising career, and a decent life. "Private sector organizations in America are as guilty as schools for failing to continually invest in the further development of the country's workers" (Wilson, 1993, p. 315). Without its own serious commitment to the training and employment of young adults who do not go to college, American industry does not have the right to complain about the declining quality of today's workforce. Such complaints are, in fact, futile. Improving schools is a necessary but not sufficient response to new economic realities (Hamilton, 1990, p. 1).

While the nation's economic well-being is indeed important, American youth's haphazard transition from high school to a career is also a matter of grave concern. New technologies have indeed created new career-level jobs that require new, more complex knowledge and skills, but they have also produced a host of temporary jobs for unskilled part-time workers. The former, or the primary labor market, is now generally closed to young adults. In this labor market, the incidence of American youth unemployment is significantly higher than both that of adult unemployment and that of youth unemployment in many other industrialized countries. Most American youth are now involuntarily confined to the secondary labor market, notably retail sales, food service, and other unskilled manual work. This labor market consists of only low-paying, low-benefit, and low-security jobs (Apling, 1992, p. 17).

Young adults' employment in various types of unskilled, dead-end jobs at the high school ages has reached a disturbingly high rate. Fifty-four percent of 11th grade students were found working at least part time in 1989, and 66% of high school seniors were employed in 1988 (Barton, 1989). Other estimates are a bit lower or higher than these, but most surveys seem to have underestimated the actual figures because information was obtained only through administering questionnaires to students themselves. This trend of

student employment in the secondary labor market is still increasing; it occurs at a time when the nation is seriously worrying about the quality of its educational system.

Many governmental officials, industrial leaders, educators, and parents decry students' part-time employment as an evil. Holding an unskilled part-time job while still in school could, according to those people, adversely affect students' academic achievements and personal characters. Their reason is simple: Such employment distracts students from school-related activities and easily leads to delinquent behavior. Despite all the negative arguments, research studies do not invariably support such claims. It seems that only when a student works in excess of 15 or 20 hours per week, it is likely that his or her academic achievements evaluated by the current educational standards will be negatively affected (Barton, 1989; Charner & Fraser, 1987, p. 53; Kablaoui & Pautler, 1994, pp. 90-92; Lillydahl, 1990; Steinberg & Dornbush, 1991; Yasuda, 1990). In addition, both negative and positive effects of student employment on school attendance, academic grades, social behavior, and work attitudes have been reported.

Quite a few distinct reasons have been stated by young people for such unskilled, dead-end employment while they are still in school. The greatest student-identified motivation appears to be the desire to make money for pleasurable pastimes and leisure activities (Borus, 1983; McNeil, 1984; Perrone et al., 1981; Wirtz et al., 1987). This may, however, be only a surface-level identification. The deep-level reason may well be that America's non-college-bound youth are fully cognizant that their school achievements will not get them anywhere outside this secondary labor market after their high school graduation. They will, as a rule, be engaged in exactly the same jobs and get the same pay until their late twenties no matter how well they achieve in school. Even when some are eventually employed in career-level occupations, they will have already forgotten most of what they learned in school about 10 years earlier. Nearly 50% of high school students

believe that some, very little, or none of what they are being taught in school will be useful in later life (Leff, 1992).

Moreover, today's American employers seldom base their recruitment decisions on high school performance. They "rarely obtain high school transcripts, examine high school teachers' recommendations, or test students' knowledge" (Lerman & Pouncy, 1990a, p. 63). The American labor market does not reward high school learning achievements (Bishop, 1989, pp. 5-6). It, therefore, does not make sense to spend so much precious time in school when what is learned there will be useless anyway. Because they are forced to wait too long after high school graduation without any certainty about their careers, American young adults cannot see the relationship between what they are doing in school and what they hope to do as skilled workers in the future (Hamilton, 1990, p. 88). "For them, 'Because you'll need it later' is simply not an acceptable answer to the age-old question 'Why do we have to learn this?'" (Adelman, 1989, p. I-9).

The economic conditions of America's non-college-bound youth appear to have become increasingly grim. The gap in earnings between high school graduates and college graduates has greatly widened (Apling, 1992, p. 16; William T. Grant Foundation Commission on Work, Family, and Citizenship, 1988, pp. 26-28). Over the past decade, earnings of college-educated males aged 24 to 34 have increased by 10% while earnings of those with high school diplomas have declined by 9% (Commission on the Skills of the American Workforce, 1990, p. 24). The proportion of young people with a living condition below the poverty line has been continuously rising (William T. Grant Foundation Commission on Work, Family, and Citizenship, 1988, pp. 20-22). A low-paying secondary labor market job is far from adequate in providing a decent life, let alone supporting a family. Without any basic medical benefits or insurance, most American

young people are inevitably thrown into critical financial situations when they happen to become sick.

Hamilton (1990) presented a set of distressing statistics. One quarter of America's high school students fail to graduate by age 18. Forty percent of all teenage girls become pregnant. Twenty percent of all young women give birth in their teens. Over two thirds of the babies borne by teenagers do not have married parents. Fifty-seven percent of high school seniors, excluding those who have dropped out or are truant, have used illicit drugs. One quarter of all crimes are committed by juveniles under the age of 18. Young adults under the age of 25 comprise two thirds of all those arrested for property crimes and half of those arrested for violent crimes. (pp. 7-8)

Whether these figures are accurate or not, it is generally believed that they represent serious problems among today's American young people. All these social problems are closely connected with the "nowhere track" for the majority of America's young adults, mainly those who are not earmarked for college. With or without a high school diploma, America's non-college-bound youngsters have little hope of obtaining any type of decent career. They need a genuine reason to do well in school, to acquire the knowledge, skills, and attitudes required for the workforce, and to stop creating all those problems for the whole society. They deserve the right to keep off the well-worn track of youth poverty and hopelessness.

When cross-national comparisons are made, it is consistently discovered that America's young adults are less prepared for the workplace, make lower academic achievements, commit more crimes, use more drugs, and have more babies than their peers in other industrialized countries. Despite some youth development theorists' argument that these problems are highly related to youth's age-related immaturity, they cannot, of course, be attributed to the intrinsic characteristics of American young people. It must be

the restraining conditions surrounding them that have caused all this direness (Hamilton, 1990, p. ix).

The problems are real, but attempts to solve these problems have largely failed. The failure is mainly due to the erroneous notion that schools alone can effectively and efficiently accomplish the tasks of training American young people and preparing them for high-skill occupations. Such school reforms as called forth by the National Commission on Excellence in Education (1983) have been directed solely toward the improvement of school-based education. Further, training efforts by vocational-technical schools, at both the secondary and post-secondary levels, often reflect the schools' interests and existing resources rather than current demands of the job market. Many school-based programs lack appropriate design, efficient management, skilled instruction, and sufficient resources. Even if some programs do have all these elements of internal efficiency, they may still not be able to meet employers' needs and expectations for initially trained workers (Herschbach, Hays, & Evans, 1992). Consequently, the occupational skills that students learn in school may not serve them well outside of school and may not be transferred to the community or workplace (Raizen, 1989; Resnick, 1987). In fact, schools alone have neither the necessary resources nor the indispensable environment that are conducive to effective workforce development.

Some industrial and educational leaders have learned from their long and numerous frustrations that if the nation is to succeed in the education and training of the workforce, industry, schools, and the government must cooperate. Indeed, the private sector has made some well-meaning attempts to assist schools through partnerships. Since these attempts have been primarily non-workplace-based and less than systematic, their prospects for success are in serious doubt (Kazis, 1992, p. 69). The charitable impulses of a handful of businesses are not likely to considerably improve the bleak situation.

Meanwhile, informed workforce development professionals have begun to look for innovative ways to help solve the frustrating dilemma. They are looking at America's successful competitors for better answers. They have generally found that the countries which have strong economies are those with well-formulated national workforce training policies that focus on economic issues. Some of those countries, especially the German-speaking ones, have well-organized workplace-based youth training systems primarily conducted by the private sector. In those countries, governmental leaders and parents strongly support both school-based education and workplace training for their youngsters. Most people believe that occupational skills are best learned on the job in the form of an apprenticeship. Learning in schools is well connected to the realities of work. Both standards and expectations for non-college-bound young adults to participate in vocational training are very high. Since they have already learned high skills in the real workplace and gained necessary maturity working among adults, young people in those countries have a very good chance of being employed in career-level occupations on the completion of their apprenticeship training. Therefore, those countries have high quality educational and training systems that are able to motivate young people to learn, provide authentic learning experiences, and prepare youngsters to become productive workers and responsible citizens.

Lessons from such industrialized European countries as Switzerland and Germany clearly demonstrate that young people can learn the required skills and knowledge in an environment in which high-quality on-the-job apprenticeship training and school-based education are connected. "Learning in a practical working environment," furthermore, "promotes personal development--in particular, the ability to work independently, self-confidence, good social behavior, [and] a good general attitude toward work and motivation" (Federal Minister for Education and Science, 1992, p. 5). The persistent

economic competitiveness of these countries is, according to many informed observers, attributable to their dual systems of vocational training. These observers have also concluded that the quality of America's vocational education may be improved through the adoption of a system modeled after the basic concepts of such a system.

Vocational training "traditionally enjoys an important place in the German educational system" (Campbell & Armstrong, 1993, p. 5). In Germany, approximately 85% of all young adults go into vocational training at age 15 or 16. Young people can begin their training in the form of either apprenticeship or full-time in-school vocational education when they complete their 9- or 10-year compulsory full-time general schooling, yet most obtain their occupational skills through the former. Apprenticeships are currently offered in 373 different federally recognized skilled trades and occupations within a variety of fields.

During their 2- to 3 1/2-year structured on-the-job training in companies and businesses, German apprentices under age 18 attend a type of compulsory part-time vocational school called the *berufsschule*[1] 1 or 2 days a week. "This statutory attendance forms part of an apprenticeship in one of the recognized skilled occupations" (Campbell & Armstrong, 1993, p. 4). These apprentices spend about 40% of their in-school time learning general subjects such as German, social studies, economics, and religion. The remainder of the school curriculum is devoted to technical subjects related to the apprentices' chosen occupations.

This system is called the "dual system" because two places--company and school--collaborate in providing complete, effective education and training. The essence of the German dual system is connection--of book learning and hands-on experiences, of the employer and the educator, and of adolescence and adulthood. Young people trained in

[1] Where word-for-word translation into English is not accurate, a German word or phrase is used.

such a system become competent workers who are qualified for post-apprenticeship employment in skilled occupations. The structured on-the-job learning experiences provided for young adults contribute not only to their personal career development but to the development of the overall workforce and national economy as well (Campbell & Armstrong, 1993, p. 6). "In Germany, employers, workers, unions, industrial and trade organizations, schools, the government, parents, and community agencies are all committed to the dual system" (Cheek & Campbell, 1994, p. 119).

The effective and efficient vocational training and school-to-work transition in Germany and other German-speaking countries have stimulated, in the United States, some serious efforts to experiment with what are commonly referred to as "youth apprenticeship programs." For example, Cornell University has initiated a Youth Apprenticeship Demonstration Project to investigate how some of Germany's principles of apprenticeship can be adopted in the United States (Hamilton & Hamilton, 1992a, p. 45). The Pennsylvania Youth Apprenticeship Program has been set up to train skilled metal workers in five metropolitan areas. Project ProTech, a Boston-based youth apprenticeship project, has been operating in the health-care industry. Jobs for the Future, a non-profit organization in the Boston area, has been exploring the potential for youth apprenticeship in the United States through a close relationship with 10 initiative sites (Kazis, 1992, p. 68). Some states, such as Arkansas, Georgia, Maine, Oregon, and Wisconsin, have enacted legislation that lays legal foundations for the development and implementation of youth apprenticeship.

Federal legislation has also been enacted. The School-to-Work Opportunities Act was passed by both the House and Senate in November 1993 and was signed into law by President Clinton in May 1994 (Brustein & Mahler, 1994, p. 19; Hudelson, 1994, p. 21). The major purpose of this legislation is twofold: (a) to enhance the American workforce

and (b) to assist American youth in making the transition from high school to a good job on a high-skill, high-wage career track. Specifically, the legislation has:

1. Established required goals and components for every School-to-Work Opportunities system in the nation

2. Provided development and implementation grants for states, localities, and poverty areas to plan, create, and/or operate comprehensive School-to-Work Opportunities systems

3. Provided waivers of certain statutory and regulatory program requirements to allow other federal funds to be coordinated with School-to-Work Opportunities systems

A School-to-Work Opportunities system is required by the act to integrate workplace-based learning and school-based education. Connection between businesses and schools is essential. Employer-provided workplace-based vocational training must be a major component of a School-to-Work Opportunities system.

In a letter to House Speaker Tom Foley which accompanied the legislative bill, Robert Reich, Secretary of Labor, and Richard Riley, Secretary of Education, wrote the following thought-provoking lines:

> The United States is the only industrialized nation without a system for helping youth make the transition from school to the workplace. That puts our young people, our businesses, and our Nation at a disadvantage. Our competitors overseas take pains to ensure that their non-college-bound youth enter the workplace with skills their businesses need, skills that lead to good jobs. We do not. Our young people receive little guidance about, or exposure to, the career options available to them. They receive little preparation for high-skill, high-wage jobs. That is why many of the 75 percent of our youngsters going to work without

college degrees spend 5 to 10 years bouncing from one dead-end job to another before settling into a career track.

Due to various cultural factors and traditional biases, developing and implementing an apprenticeship system that incorporates on-the-job training and school-based education for young adults in the United States is not an easy task. For example, the Federal Committee on Apprenticeship, in an eight-component policy recommendation, asserted that any apprenticeship systems other than the traditional American system "may be more harmful than helpful" (Federal Committee on Apprenticeship, 1992, p. 1). The traditional apprenticeship system means the existing American system that operates primarily in skilled trades in the construction and manufacturing industries. Less than 2% of recent high school graduates enter those apprenticeship programs (Glover, 1988). The mean age of admission is 27 (Filipczak, 1992, p. 26; Stern, 1992, p. 9) or perhaps even 29 (Hamilton & Hamilton, 1992a, p. 44), and it is still rising. The majority of the apprenticeships in the traditional system are clustered in a small number of trades and occupations.

Another strong opposing force comes from labor unions, who are supporters and, in many cases, operators of America's traditional apprenticeship system. Many labor union leaders in the United States contend that any efforts to expand this traditional system to include younger people will inevitably dilute the meaning and value attached to the apprenticeship credential. The contention is generally grounded on the fear that youth apprentices might displace adult apprentices and incumbent workers in unions. "Fear of job substitution has been a principal reason why U.S. trade unions have historically opposed youth apprenticeships" (Finegold, 1993, p. 3).

A third major problem is the lack of incentives for American employers to provide on-the-job apprenticeships for young adults. Not only will apprenticeship training be

costly, but the investment will have no return when adequately trained young people are immediately "bought away" by other employers. "In the United States' highly mobile labor markets, there is a major risk that trainees will be hired away by competitors" (Finegold, 1993, p. 3). In addition to the monetary concern, a prevailing attitude among American employers is that non-college-bound youth are neither capable nor conscientious.

Furthermore, a considerable number of American employers may not be interested in training young apprentices because they have already made decisions in favor of low skills and low wages. Despite technological advancements, these employers are still clinging to the Taylorist strategy (Commission on the Skills of the American Workforce, 1990; Jobs for the Future, 1991a, p. 5). They are determined to pay only low wages to their workers, even if it means that they have to move their businesses and employment opportunities to Mexico, Southeast Asia, or even countries of the former Soviet Union (Mishel & Bernstein, 1992). Although it is highly likely that youth apprentices could complete their well-organized programs with high academic achievement and occupational skills, these employers may still not be willing to provide them with career-level occupations and pay them wages commensurate with their level of competence (Apling, 1992, p. 24).

Small as they may be, the cultural, social, economic, and political differences between the United States and Germany preclude the feasibility of indiscriminately imitating all the practices of the German dual system of vocational training in the American context. The same is true with other leading economic competitors' successful models for training qualified workers. To develop and implement an apprenticeship system for young adults, of which workplace-based apprenticeship training is a fundamental component, the concrete practices, including policies, structures, procedures,

processes, and methods, which are, on the whole, the most suitable in the United States, should be identified. Americans are not yet sure what the essential practices are that would make such a system work in the United States (Rosenbaum, 1992, p. 4). The German dual system does not provide readily available answers, nor do the traditional American apprenticeship system and the various currently operating youth apprenticeship programs.

Statement of the Specific Problem

A review of the related literature revealed that a comprehensive and systematic identification of the benchmark practices of an apprenticeship system for young adults had not been conducted in the United States. Although some individual projects and programs are already operating under the name of school-to-work transition or youth apprenticeship, a high percentage of such programs are still idiosyncratic, and some are merely duplications of existing cooperative education or tech prep programs. Without the identification of the benchmark practices, the scarce resources for developing and implementing apprenticeship systems for young adults could well be wasted, and success of such systems in terms of effectiveness and efficiency would be in doubt. Without the identification of the benchmark practices, the various programs would continue to be idiosyncratic, and valuable experiences would not be effectively learned and applied by others. Without the identification of the benchmark practices, valid evaluation of youth apprenticeship programs would be a difficult, if not impossible, task.

The purpose of this study was twofold. The first purpose was to identify the benchmark practices for an apprenticeship system for young adults through collection and analysis of expert opinions about a tentative Tennessee Model of Apprenticeship for

Young Adults. The tentative model was developed on the basis of (a) an extensive review of the related literature, (b) some on-site visits to apprenticeship training establishments, (c) many in-depth interviews with experts in apprenticeship, and (d) an international study tour to Switzerland and Germany. The term "benchmark practices" means, in this study, the practices which a panel of experts consensually recognized as the "best" ones for an apprenticeship system for young adults. Based on the identified benchmark practices, the tentative Tennessee Model of Apprenticeship for Young Adults was revised and finalized. It was then proposed to the Tennessee Council on Vocational Education.

The second purpose of this study was to investigate how the finalized Tennessee Model of Apprenticeship for Young Adults would be perceived by different groups of major stakeholders who will participate in and/or have direct, critical impact on the development and implementation of an apprenticeship system for young adults.

One basic assumption underlying the study was that the finalized Tennessee Model of Apprenticeship for Young Adults, which would contain the benchmark practices for such a system, could be adopted by other states, localities, or communities in the United States without major modifications, especially if it was perceived favorably by major stakeholders. Although the model was developed for the state of Tennessee to train its workforce in a more effective and efficient manner, the consensual opinions were collected from subject matter experts from different states, in different industries, and with different position titles.

Hypotheses

For the successful development and implementation of an apprenticeship system for young adults, stakeholders' perceptions and reactions are very important.

Stakeholders in the development and implementation of such a system include mainly relevant governmental policy makers, related governmental agencies, business and industrial employers, labor unions, occupational organizations and associations, officials of the traditional apprenticeship system, vocational and academic educators, high school students, and parents. Another important but "hidden" group of stakeholders is various advising and consulting agencies for policy makers and employers. The literature review suggested that different groups of stakeholders may have different perceptions about and reactions to the specific practices of an apprenticeship system for young adults.

Among the different groups of stakeholders, those whose participation in and/or support for an apprenticeship system for young adults are essential for the success and growth of the system are the major ones. For the second purpose of this study, it was, therefore, hypothesized:

H_1: That there is significant difference among the different groups of major stakeholders in their perceptions about completeness of the finalized Tennessee Model of Apprenticeship for Young Adults.

H_2: That there is significant difference among the different groups of major stakeholders in their perceptions about effectiveness of the finalized Tennessee Model of Apprenticeship for Young Adults.

H_3: That there is significant difference among the different groups of major stakeholders in their perceptions about implementability of the finalized Tennessee Model of Apprenticeship for Young Adults.

Definitions and Explanations of Terms

In this study, the term "major stakeholders" was defined to mean the following four groups of people in the state of Tennessee: (a) presidents or chief executive officers in businesses, (b) labor union officials, (c) relevant governmental officials, and (d) directors of vocational education organizations and programs.

Such a definition of the term "major stakeholders" does not mean that other groups of stakeholders are not important. For example, various advising and consulting agencies may well influence the opinions of many policy makers and employers. The above four groups of major stakeholders were selected for the second purpose of this study because:

1. They would be directly involved in the formulation of relevant policies for apprenticeship systems for young adults and/or the development and implementation of such systems.
2. The population for the study would be accessible.
3. Reasonably representative sampling from the population would be possible.

"Perceptions" means, in this study, responses to the items in the survey instrument which was created after the Tennessee Model of Apprenticeship for Young Adults was finalized and which was administered to the sampled major stakeholders.

"Completeness," "effectiveness," and "implementability" are the terms in the survey instrument administered to the subjects. They were used to explore respondents' perceptions about and reactions to the finalized Tennessee Model of Apprenticeship for Young Adults.

"The Tennessee Model of Apprenticeship for Young Adults" is a framework that was developed, revised, and finalized on the basis of the identified benchmark practices and then proposed to the Tennessee Council on Vocational Education.

Significance of the Study

The creation of a model of apprenticeship for young adults based on benchmark practices may yield fundamental guidelines or standards for the state of Tennessee and many other states, localities, and communities to develop and implement their apprenticeship systems or programs for young adults. It may also provide necessary base-line information for policy making and/or legislation related to school-to-work transition and apprenticeship training for young adults in various states. Furthermore, it may positively inform and influence employers, labor unions, governmental officials, and educators in their efforts to train and develop the workforce in a more effective and efficient manner.

If the finalized Tennessee Model of Apprenticeship for Young Adults was perceived favorably by the four groups of major stakeholders, it would be a good indication of potential success in the development and implementation of apprenticeship systems that incorporate the expert-identified benchmark practices. If the perceptions were found to be generally negative, further research could then be conducted to investigate why these major stakeholders hold negative attitudes toward the benchmark practices or the basic concept of apprenticeship for young adults. Similarly, if significant differences in perceptions about the model were found among the different groups of major stakeholders, subsequent research that investigates why some major stakeholders are less approving than others of the benchmark practices or the concept of apprenticeship

for young adults would also be indicated. Appropriate strategies could then be formulated to either educate/convince stakeholders or adjust relevant policies.

CHAPTER II

REVIEW OF THE RELATED LITERATURE AND RESEARCH

The review of the related literature and research for this study concentrated on four areas: (a) the origin and evolution of America's traditional apprenticeship, (b) the present state of America's traditional apprenticeship, (c) the youth apprenticeship movement, and (d) the apprenticeship systems in Switzerland and Germany.

Origin and Evolution of America's Traditional Apprenticeship

Apprenticeship is an old custom that dates back to the beginnings of family life, when parents handed down to their children rudimentary craft skills along with tribal lore. The practice of indenturing young people to persons other than their parents did not begin until economic life became more complex and workers began to specialize in their crafts and trades. There is evidence that in ancient Egypt, Greece, and Rome, "apprenticeship was an integral part of the work systems of those cultures" (Shanahan, 1983, p. 2). The formal organization of apprenticeship as an institution of training could, however, be credited to guilds, which constituted the central feature of the industrial organization during medieval times.

The English Origin

Merchant guilds began to appear in England in the second half of the 11th century. They were "societies formed for the purpose of obtaining the exclusive privilege of carrying on trades" (Bray, 1980, pp. 4-5). Craft guilds, which were associations of

artisans engaged in particular industries, came into existence about a century later (Ashley, 1966; Cunningham, 1922). Guilds in England were typically identified with a municipal body or a specialized department of that authority. "Either by obtaining a royal charter of their own or by using the authority of the municipality, the gilds were enabled to prescribe, down to the most minute details, the conditions under which the trades of the district were carried on" (Bray, 1980, p. 5).

The English guild organization consisted of three classes of workers: (a) the master, (b) the journeyman, and (c) the apprentice. An apprentice was indentured to a master for a period of years, usually 7, and promised to serve him honestly and obediently. During the period of indenture, the apprentice "lived in his master's house, and received from him, in addition to board and clothing, wages on a low and rising scale" (Bray, 1980, pp. 5-6). The master, on the other hand, stood *in loco parentis* and was engaged to teach the apprentice "the secrets of the trade." At the expiration of the indenture, the apprentice became a journeyman. With the change of status came a rise in wages. The journeyman usually continued to work for his master and remained a lodger in his house. He did not become a master until he had accumulated enough money to start his own business and produced a masterpiece which was approved by a guild as satisfactory evidence of qualification for the rank of master.

An apprentice paid an entry premium upon enrollment in an apprenticeship and an exit fee when he had served his term. "Apprentices were obliged by municipal legislation to enroll within the first year of their term" (Seybolt, 1917, p. 9). Enrollment was a public matter; an apprentice appeared or was brought before the municipal authorities and a master of a craft and acknowledged himself indentured to the master craftsman. This acknowledgment, as well as the terms of the indenture, then became a matter of public record. Upon completion of the apprenticeship, the apprentice again appeared before the

municipal authorities and sought the journeyman status in his craft. If he was found to have faithfully served his master and was determined to be able to carry on the trade, he was then recognized as a fully fledged journeyman. Before an apprentice was granted the journeyman status, he was required to produce a journeyman-level sample piece (Rorabaugh, 1986, p. 4; U.S. Department of Labor, 1970, p. 11).

"For hundreds of years the [English] guilds imposed severe restrictions on the use of apprentices by master craftsmen, and frequently detailed exactly how the apprentice should be trained" (Kursh, 1958, p. 39). Everything relating to apprenticeship training was rigidly determined by the rules of the guild: the period of apprenticeship, hours and conditions of work, wages and premiums, and so forth. Guilds sent their inspectors to visit workshops, examine manufacturing processes, determine the qualities of products, and prescribe methods of production. The inspectors were empowered to settle all disputes between apprentices and their masters. If a master did not fulfill his agreement in respect to training and maintenance, he would be reported to the guild and subjected to a penalty. Apprentices would be taken from masters financially unable to support them and indentured to others in the same craft for the remainder of the original term. "In some cases, and with the sanction of the gild, a master might sell some years of an apprentice's service to another master" (Seybolt, 1917, pp. 13-14).

Besides teaching his apprentice the trade, a master was held responsible for the apprentice's moral conduct. In case of transgression and incorrigibility, the master was permitted to administer punishment. The rigid supervision by guilds was, however, over both parties to the indenture. If the punishment was unjustified or undue, the apprentice could appeal to and obtain redress from the guild or municipal authorities (Seybolt, 1917, p. 14).

In their best days, English guilds represented the interests, not of one class, but of the three distinct and somewhat antagonistic classes--the business owner, the manual worker, and the consumer (Webb, 1896). The close connection between guilds and municipalities served the public well because the system of expert inspection guaranteed the quality of the goods supplied. The city authorities looked to the guilds of each craft to keep the people under their charge in control. Thus, for every public scandal or underhanded attempt to cheat in business and training, the responsible party would be held accountable (Cunningham, 1922).

One of the primary objectives of guild regulation was to limit the number of apprentices. There were three purposes associated with this limitation: (a) promoting efficient trade training, (b) protecting adult workmen from the competition of juvenile labor, and (c) diminishing the competition of adult craftsmen with each other. A closed labor market that kept craft wages high was thus maintained.

As far as the apprentice's training was concerned, the system presented unique advantages. Indentured to the master and living in his house, the apprentice would, in general, receive sufficient training. In most cases, the relationship between the master and the apprentice was not only that of trainer and learner but also that of father and son. When the apprenticeship term was over, the apprentice "found ready-made for himself an opening that led upwards from the journeyman to the small master" (Bray, 1980, p. 8). Within this system, no master was allowed to be irresponsible for the conduct of his apprentices in and outside of the workshop, and most apprentices were trained in skilled crafts and trades.

While the guild organization may justly be regarded as satisfying the conditions of the aforementioned apprenticeship system, it became ill-suited, after nearly five centuries, to the English society, which was advancing rapidly to a front place in the commercial

world. Expanding trade, wealth, and power changed guilds into associations of non-equals. Increasing competition "turned the methods of production in the direction of cheapness rather than good quality" (Bray, 1980, p. 9).

With the disappearance of the much-needed supervisory functions of guilds in England, the guarantee of excellence in craftsmanship was lost. Sacrificing the needs of all to satisfy the avaricious desires of a few, English guilds were no longer the guardians of the interests of the general public but narrow factions rent by bitter conflict and resentful envy within and regarded with open hostility by those outside. By the 16th century, guilds in England had, in many cases, lost their original character. Not only had they ceased to serve justifiable purposes, but their ill-judged interference drove workmen to leave towns and establish themselves in villages where guilds had no jurisdiction (Cunningham, 1922). In 1547, legislation directed against the property of the guild organizations dealt a death blow to most of the guilds in England and accelerated their eventual dissolution.

The apprenticeship system, however, survived the decay of the English guild system. It kept its old vitality through regulation by custom and law. The industrial conditions of the 16th and 17th centuries did not seem to produce difficulty in the way of enforcing apprenticeships. Nevertheless, the decay of the guilds' supervisory functions did open the door for uncovenanted labor to intrude into various trades without being apprenticed. Complaints and grievances from those who had paid for their privilege in long service at low wages naturally became louder and more frequent.

The dilemma of uncovenanted labor was intensified by the conflict between the traditional restriction on the number of apprentices and the augmenting demand for skilled workers. Since expanding trade in those times demanded an increased supply of skilled workers, there could be only one way out, that is, removing the limitation on the number

of apprentices. To escape the dilemma, it became necessary to have all youth, without exception, serve an apprenticeship (Bray, 1980, p. 13).

Apart from the problem of uncovenanted labor, there existed an excessive number of local laws and customs governing the training and employment of apprentices. Many of them were out of date, while others were contradictory. Seybolt (1917) observed, "Here apprenticeship was regulated by custom, here by charter, and there left undetermined. In one place a certain period of service was exacted, in another place a different period" (p. 16). Finally, the leaders of the day concluded that a national and consolidating statute was needed, one that would give the force of law to what were often only local customs.

In 1562, new national legislation known as the Statute of Artificers was enacted. This act codified the existing local laws on apprenticeship training, remodeled the whole guild system, and transformed trade regulations into a nationwide system. It also adjusted the standard of wages and fixed both the duration of apprenticeship in the manufacturing industry and the ratio of apprentices to journeymen. The minimum term was now 7 years, and an apprenticeship could not expire until the apprentice was at least 24 years old. "Parents, unless they could demonstrate the means to educate their sons for business or the professions, were required to bind them either to a trade or to agriculture" (Rorabaugh, 1986, p. 4). If a young person, not legally exempted, refused to serve in an apprenticeship, he would be brought before a Justice of the Peace and put in jail until he agreed to serve. "As in earlier gild practices, apprentices must be bound by indenture, and the terms of the agreement enrolled" (Seybolt, 1917, p. 18). To prevent the apprenticeship system from being perverted into a means for obtaining cheap labor and to facilitate proper training, every master was required to employ one journeyman for every extra apprentice if he already had three or more apprentices.

The Poor Law of 1601 gave public authorities additional powers with regard to compulsory apprenticing of all poor children. The primary objective of Poor Law apprenticeship was "not so much to teach the apprentice a trade as to 'bind him out' to a person who would maintain him" until the age of 24 (Seybolt, 1917, p. 20). This law failed to provide enough protection for "pauper apprentices"; abuse was prevalent.

Although in many instances the clauses of the Statute of Artificers were disregarded, this act remained in force for more than two centuries. It provided legal authority to a training practice which was sustained until the early 19th century. These two centuries constituted the second phase in the history of apprenticeship regulation in England. If the previous phase had been characterized by close supervision and non-centralized regulation, the characteristic of this phase was national compulsion without adequate supervision.

Evolution in America

The earliest settlers in the English colonies in America brought with them the custom and tradition of their mother country, including the age-old system of apprenticeship. "Among the thousands who went to the Continental colonies in the seventeenth century was a large proportion of skilled artisans who took with them the medieval English craft tradition as part of their cultural baggage" (Bridenbaugh, 1950, p. 3).

Although the English practice was modified in some instances to suit the new conditions, the apprenticeship system itself remained largely unchanged and played a significant part in colonial life. Premiums were frequently paid to masters for taking apprentices (Morris, 1965, p. 369). In many areas, the English practice of public enrollment of indentures was continued. Completion of indentures was also entered in the

town records. Violators of contracts, whether masters or apprentices, were punished by town or colony authorities, which were responsible for all the matters pertaining to trade regulation and apprenticeship training. Male apprentices were generally required to serve until the age of 21, with a minimum term of 7 years (Morris, 1965, pp. 372-373), and female apprentices, until they reached the age of 18 or got married. "In exchange for work and obedience, the master provided food, clothing, lodging, and training in the 'art and mysteries' of the master's trade" (Salinger, 1987, pp. 6-7). The apprenticing of poor children in the earliest colonial days was regulated by the English Poor Law of 1601. "The children of poor parents were taken away by the town, and placed with masters who would provide adequate maintenance" (Seybolt, 1917, p. 34).

The most significant departure from English law and custom in the colonial era was that parents and masters in many colonies were compelled by new legislation to give their children or apprentices rudimentary instruction in reading, writing, and, for males, arithmetic, as well as in matters of religion and law. Young people whose parents or masters were incapable of giving the required instruction were sent to schools (Morris, 1965; Seybolt, 1917).

Apprenticeship in colonial America differed from indentured servitude--its closest bound labor relative. The former "was only open to minors and invariably provided training in return for their services in specified trades" (Morris, 1965, p. 364). If the articles of an indenture contained no provision for trade training and skill acquisition, the service was a regular form of indentured servitude regardless of the label. Conversely, if a "servant" had an indenture which provided adequate training in the trade, he or she was in fact an apprentice even without such a title (Douglas, 1921; Morris, 1965, p. 364). Apprenticeship was "educational in the broadest sense and involved the intergenerational transfer of culture itself" (Quimby, 1984, p. 5). If the master engaged the apprentice in

"servile work" instead of in the trade, the courts would intervene on behalf of the apprentice. Apprenticeship was different from indentured servitude also in that the latter was typically characterized by the practice of "selling" servants (Salinger, 1987, p. 8).

Although the English Statute of Artificers and the English Poor Law were transplanted to the New World, they were generally applied without adequate organizational support and supervision. Guild traditions, which were dying back in England, never took root in America. "Since the American colonies had no guilds, the interlocking regulatory system that prevailed in England really did not exist in the colonies" (Rorabaugh, 1986, p. 4). "No effective municipal or guild ordinances governed who could practice a craft in any colonial American city" (Quimby, 1984, pp. 5-6). Some of the provisions of the transplanted English law were never exactly embodied in the colonial labor codes. Local conditions discouraged enforcement, and "colonial apprenticeship was considerably less vigorous than its English counterpart" (Rorabaugh, 1986, p. 4). As a result, the traditional English-type apprenticeship system failed to persist in America (Elbaum, 1989, p. 345).

Without the protection and supervision from the guild, there was no guarantee that the apprentice would be appropriately trained in the trade (Hatcher, 1993, p. 46). Since entry into skilled occupations required no certification (Elbaum, 1989, p. 339), informal training became a viable alternative to apprenticeship. Consequently, young people had little incentive to honor indenture commitments.

High rates of geographical and occupational mobility, especially among youth, added to the problem. "Incessant mobility made it thoroughly unwise for any employer to invest much in training his employees" (Lebergott, 1984, p. 372). The mobility was due partly to the prevailing ideology of personal freedom and partly to the fact that "there was

always land to be had by those willing to work hard enough to clear it and make it productive" (Quimby, 1984, p. 6). The lure of land was simply irresistible.

The master-apprentice relationship became disadvantageous to the latter in that "in practically every industry, the boy was compelled to perform odd jobs entirely distinct from trade activities" (Motley, 1907, p. 499). Long periods of indenture were also an obstacle to securing and keeping loyal apprentices (Becker, 1906, p. 327). The required 7-year training was, in many cases, far longer than was actually needed to learn a trade. Since they could always find better opportunities, many apprentices ran away from their masters. Along with the spread of the beliefs in personal liberty and independence, the problem of runaway apprentices, which had always existed during the colonial times, intensified after the American Revolution.

Because no legislation was ever enacted that provided for interstate cooperation in pursuing runaways, by the early 19th century, "runaway apprentices often could evade apprehension, especially if they fled across state lines" (Elbaum, 1989, p. 347). Although state laws backed enforcement of formal, written indentures and runaway apprentices, when apprehended, would be jailed and/or fined, these laws had, in reality, little impact. Very few employers took the trouble to legally enforce unwilling apprentices to serve out their full terms. Consequently, indentures did not necessarily hinder desertion of the master by the apprentice. Legal enforcement of apprenticeship indentures proved to be too difficult and costly to be practicable.

As a result of the wartime turmoil and fluctuating economy during the American Revolution, apprenticeship "became both less entrenched and more anemic" (Rorabaugh, 1986, p. 16). The massive dislocations caused by the war precipitated the decline of apprenticeship in America. In the decade following the Civil War, apprenticeship all but disappeared (Hatcher, 1993, p. 47).

During the entire 19th century, there was a constant influx of highly-skilled immigrants into the United States. "At the same time, the industrial revolution was making tremendous strides in mechanical technology with consequent specialization of labor" and expansion of economy (Kursh, 1958, p. 40). The influence of the industrial revolution greatly altered people's attitudes toward apprenticeship training. The old English-type apprenticeship system "correspondingly became an ineffective system, with the emergence and final establishment of the modern factory or large-scale production" (Motley, 1907, p. 498). The combination of these factors resulted in the American apprenticeship system becoming a mere reflection of its former self. By the late 19th century, the ratio of apprentices to total employees in factory and craft work was less than 2 to 1,000 (Elbaum, 1989, p. 348).

A decreasing number of employers were interested in binding apprentices with written agreements, and those that did indenture apprentices reserved their managerial rights to discipline and fire at will. "The absence of employer assurances became increasingly significant in light of the abuses that accompanied the long decline in apprenticeship" (Jacoby, 1991, p. 888). Without formal written contracts, apprenticeship lost its fundamental meaning. While bemoaning the decline of apprenticeship and a perceived association with skilled labor scarcity, American employers found written apprenticeship indentures burdensome "because they gave apprentices legal rights to challenge management" (Jacoby, 1991, p. 888). Consequently, the apprentice turnover made apprenticeship training a losing venture (Hatcher, 1993, p. 49). Even the schemes that "offered a deferred compensation bonus upon indenture completion, or required the posting of a bond at the outset of indenture that was refundable upon term completion" were not able to recruit and deter apprentices effectively (Elbaum, 1989, p. 347). The bonus was too far away and figured out but insignificantly when reduced to the hourly

basis. In addition, a deposit from an applicant restricted the number of available apprentices (Becker, 1906, pp. 332-333).

Although some employers and employer associations called for a revitalization of the apprenticeship institution in the United States, little came of their appeals. In most trades, employers showed "little regard for the custom of taking a boy for a specified term of years and teaching him the trade" (Sikes, 1894, p. 402). "Within the U.S. context, firms were unable to establish collective, market-wide standards regulating employment and training within the skilled trades" (Elbaum, 1989, p. 348).

The lack of regulations regarding the number of apprentices an employer could hire and the absence of written indentures worried many journeyman-level workers. They strongly felt the unfavorable effects of competition against a potentially unlimited number of apprentices. Meanwhile, they maintained that young apprentices "were not being properly trained in their trades, to the future detriment of the craft, to the injury of the public at large, and to the wrong of the apprentices as a class" (Sikes, 1894, p. 402). Consequently, many labor unions prescribed their own rules regarding the number of apprentices and their training.

The labor unions declared that they by no means claimed the exclusive right to form apprenticeship regulations. They insisted that "the matter should be settled by conference between employers and journeymen, though they may sometimes be persistent in asking that the agreement reached shall be such a one as they think right" (Sikes, 1894, pp. 403-404). Most employers, however, maintained that apprenticeship regulations were their own business and resented any interference from organized labor. They often refused to confer on the subject. Under these circumstances, strong labor unions would enforce their own regulations. The enforcement of such regulations often irritated employers and frequently resulted in severe conflicts.

By the early 20th century, the United States had to find ways to adapt to the decline of the age-old apprenticeship system. Trade schools were built, public vocational education programs were established, and corporate training schemes were devised. "Some companies trained no skilled workers, preferring to hire them on the external labor market, while others used internal promotion" (Hatcher, 1993, p. 50).

Apprenticeship would have completely disappeared in the United States had it not been for the transformation that occurred between the late 19th and early 20th centuries. In 1911, Wisconsin enacted the first legislation in the United States to promote an organized system of apprenticeship. "The law placed apprenticeship under the jurisdiction of an industrial commission" (U.S. Department of Labor, 1993a, p. 14). The 1920s saw a movement in which national employer and labor organizations as well as the federal government began a concerted effort to bring about a national, uniform apprenticeship system (Barbash, 1967). Representative groups of the construction industry were in the forefront of this movement. Meanwhile, immigration was curtailed after World War I, thus causing not only a national concern over the decrease in the supply of skilled workers from other countries but also a nationwide recognition of the need for comprehensive training of apprentices (U.S. Department of Labor, 1993a, p. 14). These combined efforts to transform the apprenticeship system finally led to the congressional passage of the National Apprenticeship Act of 1937.

This law, commonly known as the Fitzgerald Act, called upon the Secretary of Labor to formulate and promote standards for apprenticeship training, to cooperate with state agencies in the formulation and promotion of such standards, to encourage inclusion of such standards in contracts of apprenticeship, to safeguard the welfare of apprentices, and to bring together employers and labor for the establishment of apprenticeship programs. "The Law contains no provisions for penalties. Its purpose is only to promote

voluntary cooperation between industry and labor, and to offer technical assistance and guidance" (Kursh, 1958, p. 41). The Federal Committee on Apprenticeship, which was created by the Secretary of Labor in August 1934 to serve as the national policy-recommending body on apprenticeship matters, was reorganized "to include equal representation of employers and labor, plus a representative of the U.S. Office of Education" (U.S. Department of Labor, 1993a, p. 16). The Apprentice-Training Service, now called the Bureau of Apprenticeship and Training, was formed as the national administrative agency in the Department of Labor "to provide service to existing apprenticeship programs and technical assistance to organizations who would like to establish an apprenticeship program" (U.S. Department of Labor, 1993b, p. 1).

By the end of the 1930s, the transformation eventually turned into a change from a contractual arrangement between an employer and an apprentice to an institution closely associated with organized labor. The weight of the institutional rules shifted from exclusive safeguarding of employers' interests to adequate protection of apprentices as well as journeyman-level workers. In this reformed system, it was organized labor that was able to require employers to perform training tasks explicitly defined in apprenticeship indentures (Jacoby, 1991, p. 887). In many trades, especially those in the construction industry, organized labor rather than management gained greater control over entry into as well as the overall operation of apprenticeship programs. Realizing the importance of controlling the number of apprentices and their training, "organized labor succeeded in appropriating the apprenticeship institution for their own purposes" (Jacoby, 1991, p. 908).

The transformation set the pattern for today's system of apprenticeship in the United States. A key feature of current American apprenticeship training programs is that many of them are operated and managed jointly by labor and management through, for

example, joint apprenticeship committees (Riccucci, 1991, p. 182). "In the United States there are about 7,000 joint apprenticeship and training committees which constitute a major force in initiating and conducting apprenticeship" (Organisation for Economic Co-operation and Development, 1979, p. 30). In general, these committees are comprised of equal numbers of representatives from unions and employers' associations (Glover, 1980, p. 2). In some trades, union representatives tend to have dominant influence on these joint apprenticeship committees; in others, employers and unions are inclined to participate on a more equal basis. While nearly 80% of all programs are now sponsored unilaterally by employers, programs that are administered by joint apprenticeship committees account for almost 80% of all registered apprentices (Glover, 1980, p. 1) or perhaps up to 90% (Gehan, 1990, p. 1). Another estimation is that joint apprenticeship committees account for the training of 68% of all the registered apprentices, although they represent only 17% of the total registered programs (Mitchell, 1977). One very important feature of American apprenticeship is that many of the established apprenticeship programs, especially those jointly operated by employers and labor unions, are registered with the Bureau of Apprenticeship and Training or state apprenticeship councils/agencies (Hatcher, 1993, p. 50).

During the 1960s and early 1970s, the number of registered apprentices in the United States grew steadily, from about 160,000 in 1960 to almost 300,000 in 1974. It reached a peak of about 325,000 in 1979. After a decline in the early 1980s, it began to rise again in 1985. In 1990, the United States had approximately 283,000 registered civilian apprentices and about 44,000 uniformed military apprentices (General Accounting Office, 1992, p. 2).

Over the past decade, the average number of registered apprentices has been somewhere between 250,000 and 300,000. However, this number constitutes only about

0.5% of the total American workforce (Hamilton & Hamilton, 1992a, p. 44) and is equivalent to no more than 2% of the number of American college students (General Accounting Office, 1992, p. 3). The total number of registered apprenticeship programs has increased to more than 40,000 (Marshall & Schram, 1993) or about 43,000 (General Accounting Office, 1992, p. 2; Shenon, 1992, p. 7). It has remained at this level since the mid-1980s. In 1990, about half of the registered programs had no apprentices. Since 1980, federal appropriations for apprenticeship services have declined by about 30% (General Accounting Office, 1992, p. 18).

Present State of America's Traditional Apprenticeship

America's traditional apprenticeship system is unique. It is distinct from both its English ancestor and other European models. Operating in an insignificant number of skilled occupations and focusing on a small percentage of adult workers, America's traditional apprenticeship is, in general, not part of its system of vocational-technical education for young adults.

What American Apprenticeship Is

Apprenticeship in the United States is a form of long-term skill training. In a policy recommendation, the Federal Committee on Apprenticeship (1992) of the U.S. Department of Labor defined the American apprenticeship as a particular training strategy with eight essential components:

1. Apprenticeship is sponsored by employers or management/labor groups that have the ability to hire and train individuals in the workplace. It combines supervised, structured on-the-job training with related theoretical instruction.

2. Apprenticeship prepares people for skilled employment by conducting training in bona fide and documented employment settings. The needs of the workplace and industry determine the content and length of training, both on the job and in the classroom.

3. Apprenticeship has specific legal status and is regulated by federal and state laws and regulations.

4. Apprenticeship leads to formal, official credentials--a certificate of completion and a journeyman-level worker status.

5. Apprenticeship generally requires a tangible and sizable investment on the part of employers or management/labor sponsors.

6. Apprenticeship provides wages for apprentices at least during on-the-job training in accordance with pre-defined wage progression scales.

7. Apprenticeship allows participants to learn by working directly under the supervision and tutelage of skilled workers in their occupations.

8. Apprenticeship involves both written agreements and implicit social obligations between program sponsors and apprentices. Written agreements specify the roles and responsibilities of each party, and implicit social obligations include the right of employers and program sponsors to employ apprentices upon completion of training and the right of apprentices to expect such employment (pp. 1-2).

An apprenticeship normally covers all aspects of an occupation and includes both on-the-job training and related theoretical instruction. The apprentice learns the entire range of skills required by the occupation. For example, apprentice auto mechanics learn how to repair automotive equipment, how to diagnose malfunctions, and how to use the principal tools and test equipment found in an automotive shop. They also learn how the various systems are designed and become familiar with the pertinent safety precautions

(Bureau of Labor Statistics, 1991/1992, p. 27). One distinguishing characteristic of apprenticeship is that the apprentice does real work on the job while the journeyman-level worker demonstrates and coaches instead of just telling the apprentice how to perform. According to Shanahan (1983), exemplary on-the-job instruction would ordinarily proceed as follows:

1. Determining, through questions, what the apprentice knows about the operation

2. Demonstrating to the apprentice each operation by slowly performing the new processes or steps while explaining key points and emphasizing safety precautions

3. Having the apprentice perform the operation and assisting him or her if help is needed

4. Having the apprentice repeat the work several times under supervision until he or she can do it alone, correctly and safely

5. Continuing the supervision to ensure that the apprentice is carrying out the methods and processes he or she has been taught

6. Encouraging questions from the apprentice to help him or her better understand the operation (p. 11)

Being a journeyman-level worker does not always mean that one is also a competent on-the-job trainer. To help on-the-job trainers obtain the instructional skills needed to train effectively, some joint apprenticeship committees provide instructor training for journeyman-level workers through an accredited college or university. For example, the National Joint Apprenticeship Training Committee for the Electrical Industry has a long-standing partnership with The University of Tennessee, Knoxville, and the Sheet Metal Workers, with Ohio State University. The Iron Workers has a similar program at The University of San Diego. These trainer training programs continue over a

period of years, usually 4 or 5, with sessions lasting for about 7 days each year, before a journeyman-level worker obtains the status of "certified instructor." Post-graduate and refresher courses are also offered to sharpen instructional skills and acquaint trainers with emerging technologies in their occupations and industries (Gehan, 1990, p. 3).

Related theoretical instruction, sometimes referred to as related technical instruction or, simply, related instruction, generally takes place in classrooms. "This instruction is usually given at vocational and trade schools, junior and community colleges, industrial training facilities, or through correspondence courses" (U.S. Department of Labor, 1979, p. 7). It teaches the techniques of the occupation as well as the conceptual and theoretical aspects behind the techniques. It also incorporates detailed discussion of how typical tasks are performed. Classes may require the study of trade manuals and educational materials and are scheduled either during the day or in the evening (Bureau of Labor Statistics, 1991/1992, p. 27).

Nevertheless, there is little consistency in related instructional programs offered for a certain occupation. The instructional content may not be adequate and/or relevant to what the apprentice is doing and will do on the job (Barbash, 1967, p. 41), and instructors may not be qualified. In some programs, related theoretical instruction is completely absent (Barbash, 1967, p. 41). Schools and training centers that offer such instruction sometimes lack teaching equipment and materials. Thus, the related instruction component is often perceived to be not as effective in producing improved job proficiency as the on-the-job training component (Geraldi, 1981, p. 55). However, it should not follow that an apprenticeship program that does not offer related theoretical instruction would be more effective or efficient. Positive results of related theoretical instruction were frequently reported (Renzi, 1977; Shigetomi, 1971). The U.S. Department of Labor (1989) declared that "much evidence suggests that the combination of experiential training

and related instruction is highly effective--perhaps the most effective learning mode--in a wide variety of settings" (p. 11).

Depending on the trade, apprenticeships range from 1 to 6 years and typically last about 3 or 4 years (Bureau of Labor Statistics, 1991/1992, p. 27; Patterson & Hedges, 1946, p. 29). During the training period, an apprentice observes and assists a journeyman-level worker at work day after day and progressively gains occupational competence through taking increasing responsibility for more difficult aspects of the occupation. The journeyman-level worker challenges the apprentice at the level the apprentice can handle. Under the guidance of the journeyman-level worker, "the apprentice gradually learns the mechanics of the trade and performs the work under less and less supervision" (Bureau of Labor Statistics, 1991/1992, p. 27).

Periodic wage progressions are scheduled throughout an apprenticeship to provide incentive and reward for steady progress in the training. The most common practice is to increase the amount of pay every 6 months (Kursh, 1958, p. 30). Generally, an apprentice's pay starts out at about 50% to 60% of that of a journeyman-level worker. During the last periods of the apprenticeship, the apprentice would reach 85% to 90% of the rate paid to a journeyman-level worker in the occupation (Bureau of Labor Statistics, 1991/1992, p. 27; Comer & Lahne, 1971, pp. 32-33; Shanahan, 1983, p. 11). The curve of wage increases follows such a pattern: slight increases in the beginning periods, rapid ascents in the middle, and sharp rises in the later stages (Patterson & Hedges, 1946, p. 81).

National provisions on apprentice-journey worker ratios vary a great deal. In general, three or more journeyman-level workers are employed for each apprentice hired. This practice of limiting the intake of apprentices is often described as one of guaranteeing the quality of apprenticeship training (Shanahan, 1983, p. 12) and protecting the welfare

of apprentices. While concern for the adequacy of training is often cited as the chief reason, "this argument does not take account of the unavailability or inability of some skilled workers in an enterprise to give training" (Organisation for Economic Co-operation and Development, 1979, p. 36). In other words, trainers' training qualifications can be more important than just ratios for the quality of apprenticeship training. Not all journeyman-level workers are qualified on-the-job instructors.

An additional reason for apprentice-journey worker ratios is the desire of organized labor to protect journeyman-level workers from the adverse effects of competition against younger and lesser-paid apprentices, especially when the unemployment rate is high. Although apprentice-journey worker ratios are usually low, many apprenticeship sponsors are not training up to the ratios prescribed. Therefore, the ratio limitation imposed by labor unions is not a primary restraint to apprenticeship training (Organisation for Economic Co-operation and Development, 1979, p. 36).

What American Apprenticeship Is Not

At the present time, America's traditional apprenticeship is not aimed at young adults who are completing high school. Rather, it functions far more often to provide upgrading and retraining for adults who are already employed (Glover, 1986). Unlike in the German-speaking countries, apprenticeship in the United States is neither an integral part of vocational-technical education for young adults nor a common path of transition from school to work (Wonacott, 1992). It is not counted as an institutional bridge from adolescence to adulthood (Hamilton, 1990, p. 39) and not even loosely linked with vocational-technical education (Grossman & Drier, 1988). American apprentices are no longer youth; they are usually adults (Hamilton & Hamilton, 1992a, p. 44).

American apprenticeship is not a completely standardized, uniform institution (Wonacott, 1992). With its 10 regional offices, the Bureau of Apprenticeship and Training oversees and serves apprenticeship functions in collaboration with councils and agencies in 28 states, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands (U.S. Department of Labor, 1993b, pp. 12-16). While state apprenticeship councils/agencies are supposed to register programs that conform to minimum federal standards, different state laws often stipulate unique requirements for apprenticeship training. "Within the federal standards, local apprenticeship committees establish their own standards" (Marshall & Briggs, 1967, p. 15). Although the Bureau of Apprenticeship and Training can assure, to a certain extent, that minimum standards are met by registered programs, there is, in fact, "no way that the national training trust can be aware of all the particular needs or problems at the local level" (Gehan, 1990, p. 2).

Moreover, many industrial employers who provide formal apprenticeships do not register their programs with the Bureau of Apprenticeship and Training or state apprenticeship councils/agencies. Without a certificate recognized by these authorities, journeyman-level workers are captives of their employers. It is difficult for them to "journey" to other businesses or geographical areas. Unlike in many European countries, unregistered apprenticeships are not illegal in the United States (Organisation for Economic Co-operation and Development, 1979, p. 29). One common estimation places the number of unregistered programs at about one third to one half of the total (Bureau of Apprenticeship and Training, 1964, p. 94; Organisation for Economic Co-operation and Development, 1979, p. 29). These programs may deviate in many significant aspects from the established federal and state standards, but "it is not clear that training is inferior for this reason" (Organisation for Economic Co-operation and Development, 1979, p. 29).

To the employers who do not register their apprenticeship programs, the benefits of registration seem to be outweighed by additional regulations and red tape. Some of them consider the Bureau of Apprenticeship and Training and the state apprenticeship councils/agencies to be too closely tied to labor unions; others are simply not interested in training well-rounded skilled workers. In fact, in the 12 years between 1980 and 1992, the number of apprentices registered with the Bureau of Apprenticeship and Training and the state apprenticeship councils/agencies was lower by over 57,000 than in the previous decade (U.S. Department of Labor, 1992, p. 5).

In addition, apprenticeship programs may be sponsored by single employers or groups of employers, by single employers working jointly with labor unions, or by groups of employers working jointly with labor unions (General Accounting Office, 1992, p. 8; Glover, 1980, p. 1). Related theoretical instruction is actually delivered by all kinds of teachers and in all kinds of facilities.

Apprenticeship is not a widely utilized training strategy in the United States (General Accounting Office, 1992). Although "the Federal and State Apprenticeship Agencies recognize over 800 occupations as apprenticeable" (U.S. Department of Labor, 1993b, p. 5), more than three fourths of all registered apprentices are clustered in only 30 of those occupations (U.S. Department of Labor, 1987, p. 13). Statistics provided by Glover (1980), Shenon (1992), and the U.S. Department of Labor (1992) indicated that apprenticeship programs are typically grouped in 19 occupations, eight of which are construction-related and enroll approximately half of all registered apprentices in the United States. According to the General Accounting Office (1992), two thirds of all American apprentices are in 20 of about 830 apprenticeable occupations. Of those 20 occupations, all but three (correction officers, fire fighters, and police officers) are in the construction and metal trades. Other statistics in 1990 showed that more than 80% of all

registered apprentices are in 40 occupations (Bureau of Labor Statistics, 1991/1992, p. 29). Of these 40 occupations, there are 35 that each enroll fewer than 10,000 apprentices and 28 that each recruit fewer than 5,000. Even in the most representative occupations of electricians, carpenters, plumbers, pipe fitters, and sheet metal workers, workers are still far less likely to acquire their skills by means of apprenticeship than through informal means (Hamilton, 1990, p. 39). "A substantial portion of journeymen (varying as between the different crafts) have not served an apprenticeship, but have gained journeyman status through other channels" (Comer & Lahne, 1971, p. 6).

American apprenticeship is distinguished from such training schemes as cooperative education and tech prep. It is also non-equivalent to many youth apprenticeship models. Apart from many other significant differences, one major distinction lies in the fact that apprenticeship is entirely industry-operated, whereas the other schemes are mainly associated with schools. In the traditional apprenticeship system, industry sets the length, content, and organization of the training; the number of apprentices; the requirements for admission; the qualifications of trainers; and the like. Under the other schemes, these decisions are made by school personnel, often without meaningful input from industry. Generally, apprentices spend a far greater proportion of their training period on the job than students in cooperative education and tech prep programs. The traditional American apprenticeship system is characterized by the unique combination of its eight essential components (Federal Committee on Apprenticeship, 1992).

Role of Government in Apprenticeship

The basic law governing apprenticeship policy in the United States is the National Apprenticeship Act of 1937, which is administered by the Bureau of Apprenticeship and

Training of the U.S. Department of Labor. The main functions of this organization are to provide technical assistance and services to existing apprenticeship program sponsors and to promote the extension of the apprenticeship system by assisting potential sponsors in designing, implementing, and operating apprenticeship programs (General Accounting Office, 1992, p. 2; Marshall & Briggs, 1967, p. 11; U.S. Department of Labor, 1993b, p. 2). The Bureau of Apprenticeship and Training does not provide direct apprenticeship training; it establishes minimum standards and "coordinates and makes available information and data on apprenticeships for industry, labor, economists, researchers, educators, community leaders, and other interested parties" (Kursh, 1958, p. 94). More specifically, it provides technical assistance to industry in the following areas:

1. Analysis for training content and work process development
2. Development of selection procedures
3. Development of administrative procedures
4. Development of related theoretical instruction curricula
5. Program evaluation
6. Forecasting apprenticeship needs
7. Registration of apprenticeship programs which meet the minimum standards
8. Indenturing of apprentices
9. Issuance of completion certificates
10. Veterans assistance (U.S. Department of Labor, 1993b, p. 2)

The public administration of apprenticeship is complicated by the existence of state apprenticeship councils/agencies. These councils and agencies account for more than three fourths of the country's registered apprenticeship programs (Glover, 1980, p. 5). Like the Bureau of Apprenticeship and Training, they also "establish minimum standards for apprenticeship, register programs that meet these standards, provide technical

assistance to management and labor in matters of apprenticeship and training, and maintain records on apprenticeship" (Glover, 1980, p. 5). The director of a state apprenticeship council/agency is usually nominated by the state commissioner of labor and confirmed by a majority vote of council/agency members (Marshall & Briggs, 1967, p. 11). There is no clear line of jurisdiction between the Bureau of Apprenticeship and Training's regional offices and the state apprenticeship councils/agencies. Besides serving the other states in their own regions, all the regional offices of the Bureau of Apprenticeship and Training also serve the states which have their own apprenticeship councils or agencies (U.S. Department of Labor, 1993a, pp. 24-27). The Bureau of Apprenticeship and Training works together with state apprenticeship councils/agencies "to deliver support services at the National, State and local level" (U.S. Department of Labor, 1993b, p. 2).

The Bureau of Apprenticeship and Training is guided and assisted by the Federal Committee on Apprenticeship, which was created by the Secretary of Labor in August 1934 to carry out Presidential Executive Order 6570-C and was re-authorized by the National Apprenticeship Act of 1937. The Federal Committee on Apprenticeship serves as an advisory group to the Secretary of Labor and is chaired by a public member selected by the Secretary of Labor. It has a tripartite membership made up of representatives from management, labor, and the public. "The Committee's recommendations to the Secretary of Labor concern a broad range of activities to improve and expand the apprenticeship system" (U.S. Department of Labor, 1993b, p. 11). "Its tasks include reviewing apprenticeship regulations, advising apprenticeship officials on policy matters, and coordinating research on apprenticeship" (Glover, 1980, p. 5). While the Federal Committee on Apprenticeship establishes general federal regulations for apprenticeship, the Bureau of Apprenticeship and Training and the state apprenticeship councils/agencies are primarily responsible for implementing those regulations.

The Federal Committee on Apprenticeship also "decides such questions as whether a particular occupation--welder for instance--is an apprenticeable skill, or merely one aspect of a more general skill" (Kursh, 1958, p. 93). According to Glover (1980), an apprenticeable occupation is a skilled trade which possesses the following characteristics:

1. It is customarily learned in a practical way through a structured, systematic program of supervised on-the-job training.
2. It is clearly identified and commonly recognized throughout an industry.
3. It involves manual, mechanical, or technical skills and knowledge which require a minimum of 2,000 hours of on-the-job work experience.
4. It requires related theoretical instruction to supplement on-the-job training (pp. 3-4).

The Bureau of Apprenticeship and Training and the state apprenticeship councils/agencies register apprenticeship programs which meet certain minimum training and administrative standards. While standards for different occupations are not the same, they typically include:

1. Specified work schedules and rotation processes for on-the-job training (a minimum of 1 year or 2,000 hours)
2. Related theoretical instruction (normally a minimum of 144 hours per year)
3. Supervision of on-the-job training
4. Facilities to train apprentices
5. Procedures for evaluation of progress in on-the-job training and related theoretical instruction
6. Maintenance of records
7. Ratio of apprentices to journeyman-level workers
8. Probationary period, safety training, and equal opportunity

9. Employer-employee cooperation
10. Qualifications for entry into apprenticeship
11. A minimum entry age (not younger than 16)
12. Credit for prior experience
13. Apprentice wage schedules
14. Terms of apprenticeship agreement
15. Recognition of successful program completion (Glover, 1980, p. 5; Marshall & Briggs, 1967, p. 12)

Only apprenticeship programs which meet the minimum standards established by the Bureau of Apprenticeship and Training and the state apprenticeship councils/agencies are eligible for registration with these organizations. In order to give apprenticeship the dignity that it deserves, those who successfully complete registered apprenticeship programs are issued, often in ceremonies, certificates of completion by either the Bureau of Apprenticeship and Training or the state apprenticeship councils/agencies (Glover, 1980, p. 6; Kursh, 1958, p. 93; Marshall & Briggs, 1967, p. 12). With such certificates of completion, graduates of registered apprenticeship programs are able to secure journeyman-level jobs more easily in geographical areas other than their own.

While the financing of apprenticeship in the United States is, in principle, the responsibility of the private sector, federal government assistance was first granted in response to the federal emphasis on opening apprenticeship to minority groups. Federal education and training allowances to veterans also included apprenticeship. Comprehensive Employment and Training Act funds supported a variety of apprenticeship activities (Organisation of Economic Co-operation and Development, 1979, p. 65).

Over the past 50 years, the government has partially funded the classroom portion of apprenticeship training for many programs. A significant portion of related theoretical

instruction is offered in public schools and community colleges (Clark, 1952, p. 23; Glover, 1980, p. 1). Even when private industry facilities are utilized, part of the instructors' and administrators' salaries are funded by vocational education moneys from federal, state, and local sources. In some areas, only apprentices in registered programs are permitted to use the public school system for related theoretical instruction.

Employer and Labor Union Attitudes toward Apprenticeship

American employers' views on apprenticeship vary considerably from case to case. The majority of employers in the United States, however, do not seem interested in this training strategy, especially when they are compared with employers in Switzerland, Germany, and many other European countries. To match the proportion of apprentices in Germany, the United States would have to multiply its own number of apprentices by at least 28 (Reubens, 1980, p. 11). Many American employers appear to believe that it is hard to recoup costs of apprenticeship training and to make a profit from apprentices' contribution to production.

Generally, larger employers in the higher-wage industries are more willing to support apprenticeship than smaller, lower-wage employers, probably because they are less likely to lose their skilled workers after training (Glover, 1980, p. 3; Marshall & Briggs, 1967, p. 14). Such employers tend to sponsor apprenticeship programs individually or in collaboration with labor unions. They benefit from the apprenticeship system in that they get workers who were trained according to the methods and standards specified by the industry itself (Marshall & Tucker, 1992).

Since some employers acting in their own profit-maximizing interest prefer to pirate away skilled workers others have trained, small and low-wage businesses are, on the whole, reluctant to train apprentices on an individual basis for fear that they will lose them

to competitors. This has eroded the skills of the workforce over time and deteriorated the health of many occupations. To survive together in competition, small businesses in some industries band together in the form of associations and establish mutually-funded apprenticeship programs. Participating businesses contribute financially to the apprenticeship funds of these associations and, in return, have their apprentice training sponsored and financed by them. As a rule, dues are in proportion to the number of apprenticed workers an employer uses. Even under such circumstances, however, most small businesses "are likely to spend on training only what they are pressured [to spend] by a trade association or union" (Mangum, 1975, p. 191).

Employers in some industries such as construction are more interested in apprenticeship training than others. In fact, building trades account for well over half of all registered apprentices in the United States (Bureau of Labor Statistics, 1991/1992, p. 28; Organisation for Economic Co-operation and Development, 1979, p. 49; Shenon, 1992, p. 7). Nearly all the apprenticeship programs in the construction industry are jointly sponsored by employers and labor unions, with the latter having more control over program administration. A key incentive to motivate construction employers to participate in registered apprenticeship programs is the Davis-Bacon Act of 1931. This act mandates that all workers, including apprentices, be paid at full journeyman-level worker wage scales but, at the same time, permits employers to pay apprentices less than those rates if their apprenticeship programs are registered with federal or state apprenticeship agencies.

Employers are more interested in training apprentices if the jobs they have available require skilled workers in identifiable and recognized classifications (Marshall & Briggs, 1967, p. 14). Through the training of apprentices, employers have the chance to

observe and evaluate them under actual work conditions prior to offering permanent jobs, thus avoiding the usual risk-ridden recruiting process.

American labor unions take an interest in apprenticeship primarily as a means to control the supply of labor and to prevent the excessive use of low wage apprentices in competition with their journeyman-level worker members. One of labor unions' major objectives for apprenticeship is to increase job security for their members. Many labor unions claim to accept anyone who is qualified but retain the right to decide what "qualified" means in terms of local labor market conditions (Organisation for Economic Co-operation and Development, 1979, p. 49). Through their tight control over whom to admit, many labor union officials also use such restrictions as a technique to provide job opportunities for relatives and friends (Lerman & Pouncy, 1990a, p. 70; Marshall & Briggs, 1967, p. 13). Although many "unions in the United States use a hiring hall system in which jobs are distributed through formal posting and assignment, many jobs are in fact distributed informally" (Bailey, 1993a, p. 8). The labor unions' interest in apprenticeship is such that although some people believe that apprenticeship is moribund, many in organized labor "feel so strongly that if the Federal Government discontinued its modest programs, these unions would continue to develop apprenticeship training as they have over the years" (Foltman, 1964, p. 112).

Another important objective labor unions have for apprenticeship is to control craft competence, thus protecting their members' wage rates as well as their status. Union craft workers cannot expect to maintain their wages at a high level unless their productivity is higher than that of non-union workers. Meanwhile, through apprenticeship, labor unions are able to provide their members with job competence and prevent craft fragmentation which would make union members less adaptable to technological and organizational change. By maintaining craft or occupational identity, apprenticeship also strengthens

labor unions as an institution and makes it possible for them to maintain their role as a key source of skilled workers on the labor market. Some labor unions even insist that "a person who receives training must fully reimburse the apprenticeship trust fund for all training expenses if he or she works for a nonunion firm" (Gehan, 1990, p. 2).

Barbash (1967) succinctly summarized four benefits of apprenticeship for labor unions: (a) regulating the supply of skilled labor, (b) maintaining high wages for journeyman-level workers in unions, (c) strengthening the employment security of journeyman-level workers in unions, and (d) supporting labor unions' institutional power (p. 38).

Advantages of Apprenticeship

Good apprenticeship programs, like other forms of work-based or on-the-job training, may have significant benefits in preparing workers for the workplace (U.S. Department of Labor, 1989). On-the-job training under the direct supervision of journeyman-level workers would allow full participation by apprentices in the process of working and learning. Through daily observation and learning from journeyman-level workers at work as well as practical, hands-on experiences, apprentices "can build technical skills, experience the sharing of tasks, and see how technical tasks relate specifically to theoretical knowledge and interpretation" (Wonacott, 1992, p. 1). They are also more likely to understand how technical tasks can be affected by the context in which it is performed and why the workers' performance must take the context into consideration.

As part of a standard apprenticeship program, apprentices are scheduled to rotate on the job through all phases of the work (Glover, 1980, p. 7). Working with different kinds of people in an actual working situation, apprentices may gain an overall picture of

the operation and organization. "Apprenticeship gives workers versatility by teaching them all aspects of a trade" (Bureau of Labor Statistics, 1991/1992, p. 28). A well-structured apprenticeship program does not narrowly focus on particular aspects of a trade. "When changes are made in production, these workers provide the versatility needed for quick adaptation of work components to suit the changing needs" (Shanahan, 1983, p. 5). The breadth of apprenticeship training makes apprenticeship graduates less vulnerable to labor demand shifts and more adaptive to technological and organizational changes.

Apprenticeship graduates are generally more educated, better skilled, and more productive workers than craft workers trained in informal ways (Bureau of Labor Statistics, 1991/1992, p. 28). They also work more steadily and safely. An adequate supply of skilled workers with these qualities is vital to a nation's industrial and economic growth.

Because they possess those qualities and because their training is market-driven, apprenticeship graduates usually experience less unemployment and greater job stability than non-skilled and semi-skilled workers. "Generally, an organized program of apprenticeship can earn graduates recognition as skilled workers and can ensure them good jobs with good pay" (Bureau of Labor Statistics, 1991/1992, p. 28).

Not only are apprenticeship graduates generally secured a promising career and a decent standard of living, but many of them become supervisors on production lines and top level officials in American businesses. Apprenticed skilled workers have a good chance of being promoted to higher paying positions as foremen, supervisors, and executives. Studies indicated that apprenticeship graduates generally enjoy more steady employment and greater earnings than other journeyman-level workers and "tend to advance to supervisory positions more rapidly and more often than do other journeymen"

(Glover, 1980, p. 7). According to Kursh (1958), among the thousands of civilians who work for the Navy, 80% of the supervisory personnel are former apprentices. Shanahan (1983) reported that as many as 40% of the 300 apprenticeship graduates still on the payroll of a large manufacturer of electrical and automotive equipment held important supervisory or executive positions. A survey conducted by the Associated General Contractors of America showed that 90% of the top officials of construction companies began their careers as apprentices (Shanahan, 1983, p. 5). Many of the project managers, superintendents, and craft supervisors employed by those companies were also graduates of apprenticeship programs.

A contrasting perspective on the traditional American apprenticeship system is, however, that "completing a program gives a worker little advantage in the labor market" (Hamilton, 1990, p. 40). Hamilton added that program dropouts and non-apprenticed workers are often able to compete with certified journeyman-level workers. "In the United States it is estimated that half of the entrants fail to complete their apprenticeship" (Organisation for Economic Co-operation and Development, 1979, p. 38). The average completion rates among carpenters' programs are even lower. The high dropout rates are due partly to the fact that many American apprentices are able to obtain satisfactory pay and work as full journeyman-level workers without completing their apprenticeships (Glover, 1980, p. 7; Marshall & Briggs, 1967, p. 21; Organisation for Economic Co-operation and Development, 1979, p. 36). American government, employers, and labor unions do not restrict achievement of the journeyman-level worker status only to apprenticeship graduates; informal avenues are accepted.

Qualifications for Apprenticeship

Requirements for admissions to apprenticeship programs vary from trade to trade and from program to program. Four factors are usually considered: (a) age, (b) education, (c) physical condition, and (d) aptitude.

Age. In accordance with child labor laws, the minimum allowable age for regular employment is 16. These laws also bar young people under the age of 18 from hazardous occupations. The U.S. Secretary of Labor declared 17 occupations to be particularly hazardous or detrimental to the health and well-being of 16- and 17-year-olds (Jobs for the Future, 1993, p. 189). These include manufacturing and storing explosives, mining (other than coal mining), manufacturing brick, being exposed to radioactive substances, to name a few. Registered apprentices are permitted to perform some of the occupations deemed hazardous by the law, provided the work is "incidental" and "intermittent" and is performed under direct and close supervision by a journeyman-level worker. The terms "incidental" and "intermittent" are often interpreted to mean that a registered apprentice under age 18 may operate certain types of machinery in order to learn about it, but he or she should not be employed as a regular operator.

Most apprenticeship programs set the minimum age for entry at 18 (Bureau of Labor Statistics, 1991/1992, p. 29), but the actual average age for admission is much higher than the minimum. Young applicants under age 25 face increasing barriers in gaining admission to any apprenticeship programs. The maximum age for entry, usually set at 26 or 27, is a legally controversial issue. The Bureau of Apprenticeship and Training discourages maximum age requirements, and most programs have long dropped such a limitation. In practice, because they are now invariably viewed as more mature and more reliable than recent high school graduates, adults aged 25 or more almost always have the upper hand when competing against youth for apprenticeship positions. Schools

are notified of available apprenticeship openings only when these openings exceed the number of seniority employees available (Shanahan, 1983, p. 15). Some state laws do not prohibit maximum age requirements for apprenticeship. Where such age limits exist, the maximum age for veterans is higher because they can have at least part of their time in the service, usually up to 4 years, subtracted from their ages (Bureau of Labor Statistics, 1991/1992, p. 29; Shanahan, 1983, p. 3).

Education. The minimum level of education required by most apprenticeship programs is a high school diploma or a General Educational Development certificate. However, very few apprenticeship sponsors believe that the diploma indicates educational achievement. "More than 90 percent view the diploma as a sign of the applicant's reliability and staying power, proof only that they did not drop out" (Commission on the Skills of the American Workforce, 1990, p. 24). For some skilled occupations, applicants are required to have the basic skills in reading, writing, mathematics, and science. For others, individuals seeking apprenticeships may have an advantage if they have taken such vocational courses as shop mathematics, mechanical drawing, blueprint reading, and drafting. "Advanced standing is sometimes offered to entering apprentices who have attended vocational school" (Bureau of Labor Statistics, 1991/1992, p. 30). Some programs waive basic education requirements for applicants who have adequate related work experience.

Physical Condition. Good general health and specific physical abilities are required by most apprenticeship programs. An applicant may need to present a doctor's certificate stating that he or she is physically able to do the required work. It is now illegal to eliminate an applicant from consideration because of his or her physical size unless the sponsor can prove that size would prevent the applicant from learning the trade or doing the work (Bureau of Labor Statistics, 1991/1992, p. 30). Physical handicaps that would

not interfere with a person's job performance are, by law, not grounds for disqualifying an applicant.

Aptitude. Apprenticeship sponsors review applications to ensure that the applicants have fulfilled the general requirements. Program sponsors will then interview each applicant who meets those requirements. The purpose of the interview is to determine the applicant's interest in the occupation, awareness of the working conditions involved, and attitude toward the type of work that the apprentice would perform. The interview also attempts to uncover personal traits such as initiative, aggressiveness, sincerity, ambition, commitment to the program, and willingness to accept directions. The ability to work with others, a pleasing personality, and a neat appearance are important traits for some apprenticeship programs. Occasionally, occupational aptitude tests are administered to help judge the applicant's sense of balance, eye-hand coordination, color sense, agility, strength, and ability to work at heights. These are desirable qualifications in many skilled occupations.

Youth Apprenticeship Movement

Currently there is much interest in making what is commonly referred to as "youth apprenticeship" available to American young people (Hamilton, 1990; William T. Grant Foundation Commission on Work, Family, and Citizenship, 1991). More and more programs are being planned and implemented in a number of states and communities around the United States. The number of youth apprentices is expanding quickly. A growing number of educators, cognitive theorists, and policy makers believe that youth apprenticeship is an excellent model for helping solve the school-to-work transition problem because well-structured programs are highly likely to (a) improve young people's

academic achievement and occupational skills, (b) socialize young workers to the adult world of work, and (c) prepare young adults to enter promising careers (Apling, 1992, pp. 23-24). Youth apprenticeship is now being promoted as an educational scheme that can re-establish U.S. dominance in the global economy (Glover, 1991; Hamilton, 1990). It is "advanced not only as a solution to many social problems in this country but also as a strategy to restore U.S. productivity growth" (Bailey, 1993a, p. 5).

European Influence

Youth apprenticeship takes its inspiration from many European workforce training systems, particularly those in the German-speaking countries, which provide structured, non-university routes to a broad range of promising careers. Advocates of youth apprenticeship in the United States contrast American youth's high unemployment, lack of access to jobs in the primary labor market, and isolation from the adult world with the high youth employment rate, the excellent training of young adults for skilled occupations, and the significant amount of adult attention given to young people in Switzerland and Germany. Jobs for the Future (1993) argued that although it is impossible to simply imitate the Swiss and German apprenticeship models in the United States, the following basic elements of those systems are transferable:

1. Significant coordination between employers, schools, labor unions, and government
2. Integration of school- and work-based learning experiences
3. Broadly recognized certification of academic and occupational skill mastery
4. A coherent, easily understood system that serves a significant portion of young adults

5. A broad range of high-status, high-skill, high-paying career routes that do not require a 4-year baccalaureate degree (p. 9)

In the German dual system, Hamilton (1990) identified four principles that should be adopted in the United States:

1. Utilizing workplaces and community settings as learning environments
2. Linking work experience to academic learning
3. Giving youth constructively ambiguous roles as learners and workers with real responsibilities
4. Fostering close relationships between youth and adult mentors

Modeled in part after the systems of the German-speaking countries, American youth apprenticeship attempts to provide an opportunity for young adults to advance both academically and occupationally through connection between school and work. It pools the resources of high schools, regional vocational centers, technical community colleges, and private businesses and combines school-based education with on-the-job training. In the youth apprenticeship models proposed and implemented most commonly in the United States, participants would enter a 3- to 4- year program at the beginning of the 11th grade. The program would straddle the last 2 years of high school and 1 or 2 years of post-secondary education. Apprentices would be paid stipends by their employers on progressive wage scales. Those who complete the programs would be issued a high school diploma, up to 2 years of college credit, including an associate degree or a certificate, and a certificate of occupational skills (Jobs for the Future, 1993). In a few other models, however, youth apprenticeship lasts only 2 years, 11th and 12th grades, and post-secondary institutions are not involved.

Shenon (1992) presented one version of the possible structure of an American youth apprenticeship system, that of Robert Lerman: Occupational and career exploration

(i.e., site visits, work shadowing, job sampling, and employer visits to schools) would occur between the seventh and ninth grades. The following year, career counseling would start, and students would interview employers and try to obtain apprenticeship positions and contracts. Students would also have the option to pursue a purely academic education. During the last 2 years of high school, youth apprentices would spend a portion of their day/week in a workplace and the remaining time learning in academic classes applicable to the world of work and in technical courses geared specifically to their chosen occupations. The time spent on the job would increase from 30% to more than 50% of their day/week over the 2-year period. At the completion of their senior year, the students would take a test qualifying them for their high school diplomas and allowing them to continue in their programs. During the final year or two, these young people would attend community college courses while spending a majority of their time in the workplace developing the required skills in preparation for their final certification examination. After passing the examination, the participants could opt to stay with their present employers, continue their education, or use their portable credentials to find employment elsewhere.

A similar yet different model was put forth by the National Coalition for Advanced Manufacturing (1993). In this model, students are requested to sign youth apprenticeship agreements with employers and begin their youth apprenticeships in the 11th grade. After 2 years of apprenticeship training, which utilizes industry-recognized occupational standards, students should possess (a) the knowledge about the tools and machinery used in the occupation, (b) an understanding of the materials used and how they are used, (c) an understanding of common practices, techniques, customers, and products of the industry, and (d) the ability to apply academic theory to work. At the end of their senior year, students can (a) go to work, (b) enter a 4-year college, (c) begin 2 years of advanced

training and youth apprenticeship at community colleges, in conjunction with tech prep or associate degree programs, or (d) become apprentices in traditional apprenticeship programs.

While no single model of youth apprenticeship has won general acceptance, there seems to be an increasing consensus that it is different from other school-to-work transition practices such as cooperative education, tech prep, school-to-apprenticeship, vocational magnets, school-based enterprises, middle colleges, and career academies (Jobs for the Future, 1993, p. 9). Although other options also stress experience-based learning, they are mainly school-based (Stern, 1992). For example, cooperative education programs are usually the culminating coursework that a vocational education student takes after 2 or 3 years of school-based occupational training. The work experience they provide is more closely related to academic instruction. Many tech prep programs may not include work experience at all; their main planners are consortia of school districts and post-secondary institutions instead of businesses and labor unions (Apling, 1992). The non-apprenticeship practices are easier to implement in the United States and many accomplish some of the desired outcomes, but the results they produce are often not as good as those generated by apprenticeship (Rosenbaum, 1992, p. 5).

Like the apprenticeship systems in the German-speaking countries, American youth apprenticeship programs typically combine employer-provided workplace training with classroom-based instruction (Hamilton & Hamilton, 1992b). Besides many similarities, there are, however, differences in some important aspects. For example, unlike the German dual system, most American youth apprenticeship programs stress involvement of post-secondary education. Interestingly enough, while youth apprenticeship is ordinarily meant for non-college-bound youth, the majority of American youth apprenticeship programs require their trainees to obtain post-secondary degrees or

certificates in technical community colleges. American youth apprenticeship emphasizes the importance of going to college (Harrington-Lueker, 1993, p. 26).

Additionally, American youth apprentices are generally selected by schools based on academic performance and other considerations and are not required to sign contracts with employers. In Germany, however, it is businesses that select apprentices and sign contracts with them and their parents. Most importantly, German apprentices are trained by *meisters*[2] (masters) or other formally trained and certified trainers in accordance with nationally specified apprenticeship training standards, but American youth apprentices receive on-the-job training from incumbent workers who may not be qualified trainers and may not know anything about training standards. In the United States, training standards for youth apprenticeship occupations do not yet exist at the national, state, or even regional level. In some states where youth apprenticeship training standards are under development, it is generally the government alone that is making such decisions. In Germany, representatives from four sectors--employers' associations, labor organizations, state educational systems, and the federal government--form a national roundtable and outline and vote on the national regulations and standards governing apprenticeship training.

Definitions, Principles, and Elements

Kazis (1992) and Jobs for the Future (1993), a non-profit organization involved in the development of youth apprenticeship models and programs, defined youth apprenticeship as a learning program for young people of age 16 or older, a program that (a) combines on-the-job learning with school-based instruction, (b) bridges high school and post-secondary education, and (c) results in both academic credentials and

[2] The German word *meister* does not inflect for the plural. For readability in the English context, an *s* is added to the end of the word.

certification of mastery of work skills. In his explanation of the definition, Kazis (1992) stated that youth apprenticeship combines three types of programmatic and institutional integration: (a) the integration of academic and vocational education, (b) the integration of school- and work-based learning experiences, and (c) the integration of secondary and post-secondary learning. He also noted that youth apprenticeship is characterized by a learning-by-doing pedagogy as well as work and training opportunities that connect young people to the adult labor market. Youth apprenticeship emphasizes the central role of employers and of recognized occupational skill credentials and points the way to a new concept of occupational preparation for young people.

In an unpublished manuscript, Kazis (1991) suggested the following six principles for the development of a youth apprenticeship system:

1. Collaboration among secondary schools, post-secondary educational institutions, and employers
2. Provision of work-based training by employers as part of the program
3. High quality, integrated academic and occupational education
4. A focus on preparation for skilled occupations
5. Certification of occupational as well as academic skills of participating young people
6. An attempt to reach back into the early secondary or middle school years and link youth apprenticeship to a broad strategy of career exploration

According to Jobs for the Future (1991b), youth apprenticeship combines, at a minimum, three basic elements:

1. Guided work and learning experiences provided by employers
2. A linkage between secondary and post-secondary education, leading to a high school diploma, post-secondary credentials, and certification of occupational skills

3. Integration of academic and vocational learning and of school and workplace experiences through ongoing collaboration between schools, employers, relevant labor unions, and other key institutions and through innovations in curricular and instructional strategies in the classroom and at work

In 1993, Jobs for the Future refined the three elements and put forth the following six essential components of youth apprenticeship:

1. Employers provide paid work experience and structured workplace learning.
2. Schools integrate academic and vocational learning.
3. Schools and workplaces are coordinated and integrated.
4. Programs articulate high school and post-secondary learning and last at least 2 years.
5. Those who complete their programs receive widely recognized credentials of both academic and occupational skill mastery.
6. Programs are governed by broad coalitions of institutional partners (Jobs for the Future, 1993, p. 17).

When combined, those six essential components constitute a typical youth apprenticeship program. Employers provide not only paid work experience but structured training as well. Through formal training agreements, workplace training plans, mentoring by experienced workers, and other approaches, youth apprentices learn important occupational and technical skills in the workplace.

Youth apprenticeship would break down the barriers between academic and vocational learning. Classroom instruction focuses on cognitive as well as occupational skill development and is coordinated with workplace experiences so that the instructional program at one location could reinforce that at the other. A youth apprenticeship program attractive to young people and their parents usually specifies that post-secondary credits

and certificates should be transferable to 4-year academic programs. On-the-job training prepares participants for employment in any of a number of jobs that are part of a broad occupational field. Skill certification is in addition to the academic qualifications earned. Representatives from high schools, employers, workers and their unions, post-secondary institutions, community groups, and governmental agencies are part of the governance structure of the collaborative program (Jobs for the Future, 1993, pp. 9-10).

Apart from the above-mentioned components, Jobs for the Future (1991b) listed 48 specific features of a youth apprenticeship program. Some of the most important ones are:

1. Employers provide structured mentoring relationships with apprentices.

2. Schools impart academic and work-related skills and knowledge general enough to be transferable to a broad range of work and life situations.

3. Post-secondary institutions offer pre-admission or special consideration to participants who have successfully completed the first 1 or 2 years of the program and obtained a high school diploma.

4. Programs last at least 2 years, including at least 1 year of secondary and 1 year of post-secondary education.

5. Participants are employed part time during the school year with employers committed to providing guided learning experiences at the workplace.

6. Credentials of occupational achievement, recognized at least within the state, are awarded.

7. The ability to continue post-secondary learning in a 4-year college program is developed.

In December 1990, representatives of business, organized labor, education, and government gathered in Washington, DC to participate in a conference on American-style

youth apprenticeship. During the conference, youth apprenticeship was defined as a systematic mix of academic instruction in secondary and post-secondary institutions with employment-based training for students at a level of quality sufficient to certify the ability of individuals to perform entry-level tasks in skilled occupations capably and professionally. The report from the conference outlined six distinct guiding principles for youth apprenticeship:

1. It must recognize and accommodate the diversity inherent in the American populace.

2. It must be part of a broad effort to improve the linkages between the world of work and the world of high school, and not just for those who are not college bound.

3. It must provide early exposure to work experiences and genuine opportunities for workplace learning, with training wages paid by employers.

4. It must result in formal, universally recognized credentials that meet nationwide standards. The standards must be the product of collaboration between business associations, labor union representatives, schools, and governmental agencies.

5. It must assure apprentices the opportunity to go on to higher education, should they seek it, after receiving their apprenticeship credentials.

6. It must encourage life-long skill building (Nothdurft, 1990, p. 19).

The National Coalition for Advanced Manufacturing (1993) also identified three major components for youth apprenticeship:

1. Clearly defined occupational and educational standards

2. Direct and continuous involvement of business and organized labor

3. Curricula to complement workplace training (pp. 12-13)

In addition to these three components, youth apprenticeship links education and employment. Based upon industry-education-labor participation in operating committees,

youth apprenticeship offers authentic work experience and requires students to meet industry-recognized occupational standards. Youth apprenticeship must also insist upon academic competencies required by skilled occupations and foster the development of basic analytical and personal skills. Agreements that serve the best interest of youth apprentices and employers need to be signed. Businesses should pay youth apprentices on a progressive wage scale in much the same way that traditional apprentices are paid. Teachers and workplace mentors must develop career exploration activities for high school students and jointly evaluate them (National Coalition for Advanced Manufacturing, 1993).

While stating that there is not yet a fixed definition of youth apprenticeship, Bailey and Merritt (1993) claimed that it is not an expansion of the traditional apprenticeship system in the United States. They and Berryman, Flaxman, and Inger (1992) held the identical view that work-based youth apprenticeship, according to an emerging consensus, consists of four essential distinguishing components:

1. It is designed to be an integral part of the basic education of a broad cross-section of youth.

2. Its educational content integrates and coordinates vocational and academic content.

3. A significant part of an apprentice's basic education takes place on the job and is coordinated with classroom instruction.

4. Students who successfully complete apprenticeships earn recognized credentials.

In April 1992, representatives from 12 states attended a school-to-work transition initiative meeting convened by the Jobs for the Future. These states were Arkansas, California, Illinois, Indiana, Iowa, Maine, Minnesota, Oregon, Pennsylvania, Texas,

Vermont, and Wisconsin. During the meeting, a consensual framework for youth apprenticeship was created. The common system design principles, according to these states, should include:

1. The creation of a strong infrastructure that represents local and state actors, including employers, labor unions, governmental agencies, secondary schools, and 2-year and 4-year colleges and universities

2. A system in which employers and their representatives help set occupational skill standards, collaborate on curricula, provide paid work experience and workplace training for apprentices, and certify mastery of skills with the award of a portable credential

3. Articulation of programs between high schools and post-secondary, credit-granting institutions

4. Focus on learning all aspects of a broad industrial occupation rather than mastering a narrow set of skills

5. Program duration of a minimum of 2 years, consisting of at least 1 high school year and 1 post-secondary year, during which the program must constitute the core of a student's education

6. Structured integration between the workplace and the classroom and between academic learning and vocational-technical training

7. Priority on the provision of and training for high quality jobs by employers who are committed to the concept of "high performance work organizations"

8. Adequate, effective support systems for participants

9. A model that is replicable, can reach a significant scale, and is central to educational reform strategies (Jobs for the Future, 1993, p. 74)

The Term "Youth Apprenticeship"

The use of the term "youth apprenticeship" does not have a long history, perhaps shorter than the youth apprenticeship movement itself. Jobs for the Future (1993) noted:

> Before the 1992 Presidential campaign, youth apprenticeship programs were often labeled "school-to-work" programs, to avoid conflict with the registered system and its employer and union representatives. However, during the campaign, both President Bush and candidate Clinton publicly advocated creation of a national "youth apprenticeship" system. The name--which was becoming increasingly popular among programs, state policymakers, and the media--took hold. (p. 13)

As indicated in the previous section, youth apprenticeship programs normally share two basic elements with modern apprenticeships of all kinds: (a) a training strategy based on learning by doing and on the progressive mastery of skills by a novice learning on the job from experienced workers and (b) a long-term relationship that yields certification of occupational skills broadly recognized by the industry. Although it utilizes the practice of on-the-job training in the workplace coupled with classroom instruction, youth apprenticeship is different from traditional American apprenticeship in many aspects. Many specific features of youth apprenticeship programs are not found in America's traditional apprenticeship, and vice versa. For example, youth apprenticeship begins with high school students and continues into post-secondary education--a feature traditional apprenticeship does not have. Youth apprenticeship has a more comprehensive and varied academic component than traditional apprenticeship, where classroom instruction is related solely to industry-specific training (Jobs for the Future, 1993, p. 13; Kazis, 1992, p. 68). Furthermore, youth apprenticeship programs are mainly for in-school young adults, who are generally not eligible for traditional apprenticeship programs. Many youth

apprenticeships are in the expanding service industries, in which traditional apprenticeship is typically not involved.

Because of the differences between the typical youth apprenticeship model and the traditional American apprenticeship system, the term "youth apprenticeship" is considered by some to be problematic. Out of fear that lesser-paid youth apprentices might displace their own members, many labor union officials argue that the word "apprenticeship" should be reserved for the decades-old traditional apprenticeship system (Shenon, 1992). These opponents perceive youth apprenticeship as an attempt to supplant the traditional apprenticeship system in the United States (Apling, 1992, p. 38) and claim that confidence in the registered apprenticeship system will be undermined by a generic use of the term "youth apprenticeship" to identify a range of in-school programs that share only some of the characteristics of registered apprenticeship. They dispute against the term because it would give the impression that youth apprentices would receive credit toward a registered apprenticeship program (Shenon, 1992, p. 21). The organized labor and employer communities involved in traditional registered apprenticeship strongly opposed the attempt of federal school-to-work opportunities legislation to use the term "youth apprenticeship."

To many non-union employers, the term sounds problematic as well. Identifying any apprenticeship with an anachronistic training modality associated exclusively with discriminatory construction unions, these employers would rather stay at arm's length. Although youth apprenticeship generally targets industries and occupations in which traditional apprenticeship is not typically involved as well as those in which employers perceive a current or incipient shortage of technician-level workers, the term still sounds too blue-collar to many people, including many of the service sector labor unions (Shenon, 1992, p. 21). To those who are negative to the youth apprenticeship movement, the word

"youth" in the term does not draw a clear distinction between the two similar yet different workforce development efforts--youth apprenticeship and traditional apprenticeship.

For both political and practical reasons, there have been numerous efforts during the past several years to change the name. An effective youth apprenticeship system depends upon a close collaboration between employers, organized labor, educators, and government, but the term "youth apprenticeship" has become a serious obstacle to that collaboration. Since the most vocal resistance to the youth apprenticeship movement focused only on the use of the name in federal legislation, the cost of building a foundation of trust through using a different term may not be particularly high (Jobs for the Future, 1993, p. 14).

In February 1993, representatives of the registered apprenticeship system and advocates of youth apprenticeship met for the first time to discuss areas of consensus and disagreement. Participants in the meeting agreed that while the federal government should expand its support to youth apprenticeship, the proposed federal school-to-work transition legislation should not utilize the term "youth apprenticeship."

The School-to-Work Opportunities Act of 1994 was, therefore, a compromise. It does not use the name "youth apprenticeship" and mentions "apprenticeship" only a handful of times. Some people "see an admission that the idea of creating a national [youth] apprenticeship system was wrong-headed" (Harrington-Lueker, 1993, p. 27). They interpret the absence of the name "youth apprenticeship" in the act as evidence that it is not practicable.

However, the definition used in the School-to-Work Opportunities Act is literally the same as most advocates of youth apprenticeship use for youth apprenticeship programs. To qualify for implementation grants from the federal government, state and/or local programs must meet specific requirements. Although tech prep, cooperative

education, and career academies are also listed in the act (Hudelson, 1994, p. 22), school-to-work opportunities programs must include work-based learning and on-the-job training, offer students training wages, provide workplace mentors, begin no later than the 11th grade, have some link with post-secondary schools, and provide skill certificates upon program completion. Programs established under these combined requirements are not the same as other types of programs that already exist (Harrington-Lueker, 1993, p. 27). When applying for a federal grant, it will be critical for a program to show not only the school element but the workplace-based component and their connection as well (Hudelson, 1994, p. 21). In the views of advocates of youth apprenticeship, the Clinton Administration only made the necessary political adjustment in the School-to-Work Opportunities Act and moved away from the problematical word, not the essence of youth apprenticeship. In fact, six states--Arkansas, Georgia, Maine, Oregon, Pennsylvania, and Wisconsin--have established statewide systems with the name of "youth apprenticeship" (Harrington-Lueker, 1993, p. 25). "Given that numerous state and local initiatives already use the term 'youth apprenticeship,' including legislation enacted in at least five states, a shift in terminology is unlikely to occur everywhere or overnight" (Jobs for the Future, 1993, p. 14).

Semantics aside, as a result of the School-to-Work Opportunities Act, every state is actively considering school-to-work transition. All 50 governors sent their teams of representatives to a conference in Baltimore in September 1994 on how to secure the funds for establishing and implementing school-to-work opportunities programs (Harrington-Lueker, 1993, p. 27). The U.S. Departments of Labor and Education awarded the first implementation grants, $43 million in all, to eight states: Kentucky, Maine, Massachusetts, Michigan, New Jersey, New York, Oregon, and Wisconsin (Hudelson, 1994, p. 21).

Some Typical Youth Apprenticeship Programs

Most of the youth apprenticeship programs were initiated in the early 1990s. Some of them are built on the commonly proposed principles and components, and others are conversions from existing vocational and school-to-work transition programs. These programs cover a variety of occupational areas, such as computer technology, financial services, health care, manufacturing technology, metalworking, and printing. The following is a description of three programs: Maine Youth Apprenticeship Program, Cornell Youth Apprenticeship Demonstration Project, and Project ProTech. These programs are considered to be "typical" because (a) they include many youth apprenticeship components identifiable in the literature review and (b) they have received much publicity. It should be noted, however, that differences in program designs exist not only between the "typical" and "atypical" programs but also among the "typical" ones (see the section Differences in Program Designs of this chapter).

Maine Youth Apprenticeship Program. In Maine, youth apprenticeship is a new, 3-year course of study for high school students. It begins in the 11th grade and concludes with a year of tuition-free post-secondary study offered by the Maine Technical College System. It was developed in early 1993 through a collaborative effort among the Maine Technical College System, the Maine Department of Labor, the Maine Department of Education, and the Office of the Governor. The first participants were 15 high school juniors.

Administered and coordinated by the Center for Youth Apprenticeship in South Portland, the Maine Youth Apprenticeship Program has these key features: (a) career counseling and support services to 9th and 10th graders by job specialists from the Jobs for Maine's Graduates program, (b) testing for common core learning and apprenticeship

selection testing, (c) 50 weeks per year of alternating blocks of full-time study and full-time work, (d) applied academics and related work experience, (e) student stipends and benefits, (f) a high school diploma and a certificate of skill mastery, and (g) membership in a youth apprentice "guild." Those who successfully complete the program receive job placement assistance. They may also continue to earn an associate degree or transfer to a baccalaureate program.

Currently, student apprentices may choose from 14 occupations, including machine tool technology, insurance, banking, printing and graphics, office administrative services, plastics mold technology, and medical administration. More than 200 mentors, called *meisters* in Maine, have received 4 hours of orientation about the apprenticeship program. About half of the state's high school student population has the opportunity to apply for the 150 youth apprenticeship positions currently available.

Cornell Youth Apprenticeship Demonstration Project. In Broome County, New York, Cornell University has initiated a youth apprenticeship demonstration project to investigate how some of Germany's principles can be adopted in American high schools (Hamilton & Hamilton, 1992a, p. 45). It is both a work-based learning program for high school juniors and seniors and a research and development project. In 1991-1992, the project's 1st year, five high schools and four employers were involved. The four employers provided 21 2-year youth apprenticeship positions for high school juniors in health care, office administration and technology, and manufacturing and engineering technology. As of June 1993, 16 graduates entered either community colleges or 4-year colleges. Four entered programs leading to occupational certification. Fifty-one youth apprenticeships were created in the 1992-1993 and 1993-1994 school years.

In this demonstration project, students spend 10 to 20 hours per week, including summers, in supervised, paid work experiences. Senior students are assigned projects that

involve researching an issue relevant to their work. At least one academic teacher is responsible for working with each apprentice on his or her project. Based on employers' input, schools are adding pertinent courses and eliminating those that are insufficient or obsolete.

A set of principles has been generated for this youth apprenticeship demonstration program. These principles include:

1. Youth apprenticeships are organized by career areas, not specific jobs.

2. Youth apprenticeships structure learning through workplace-based experiences.

3. Employers develop learning environment for apprentices.

4. Schools adapt instruction to take maximum advantage of apprentices' work experience.

5. Training and support are provided for classroom teachers, training directors, area coordinators, coaches, and mentors.

6. Youth apprenticeship is potentially appropriate for both high-achieving students and "at-risk" students.

7. Youth apprentices are paid employees.

8. Youth apprenticeships require contracts signed by apprentices, parents, and employers.

9. Youth apprenticeships lead youth toward academic diplomas and skill certifications.

10. Both employers and schools assume operating costs for youth apprenticeship programs (Hamilton, Hamilton, & Wood, 1991; Hamilton & Hamilton, 1992a).

Based on the above 10 principles, a 4-year apprenticeship which begins in the junior year of high school and continues through 2 years of community college is being

envisioned. Diplomas will be awarded to youth apprentices by both high schools and community colleges "using the same standards that apply to other students" (Hamilton & Hamilton, 1992a, p. 47). Skill certification will be handled by employers and will be based on competency demonstration, supervisor judgment, and test performance, but not on hours of training. "Ultimately, [youth] apprenticeships may be registered with the New York State Department of Labor, yielding [a] portable credential that is recognized nationwide" (Hamilton & Hamilton, 1992a, p. 47).

In this youth apprenticeship system, the workplace is expected to have four levels of training personnel available: (a) the training director, (b) area coordinators, (c) coaches, and (d) mentors. The training director is responsible for determining and overseeing the work-based learning program and planning an appropriate job rotation. Area coordinators are responsible for identifying and assessing coaches, planning the sequence of training experiences in their area, and evaluating the apprentices' overall performance in the area. Coaches work day to day with apprentices, assigning tasks, instructing, answering questions, evaluating, and troubleshooting. Mentors take youth apprentices under their wing, giving them advice not only about the technical aspects of the work but also about the social norms of the workplace. Coaches can be mentors, but mentors who are not immediate supervisors can, according to Hamilton and Hamilton (1992a), often be more helpful.

To expose them to a broad range of occupational skills, youth apprentices will be "cross-trained," that is, rotated through several jobs. Specialized preparation for particular jobs will be postponed as long as possible. In all occupations, broad and applicable knowledge and skills, usable in multiple jobs and workplaces, will be emphasized (Hamilton & Hamilton, 1992a, p. 45). The knowledge and skills required for specific jobs will be identified through job analysis.

Project ProTech. Project ProTech (Health Care) is a collaborative effort of the Boston Private Industry Council, Jobs for the Future, 10 area hospitals, and Boston public schools. The project was launched in 1989 as one of the outcomes of the implementation of the Boston Compact, a cooperative agreement between business and education. Based in Boston, Project ProTech combines classroom learning and paid work experience in a 2 + 2 youth apprenticeship model that links high schools with community colleges. "Students spend the last 2 years of high school taking academic classes that support their chosen occupation and working in a business that agrees to hire them when they graduate and earn certification. A second 2 years of training includes more on-the-job experience and more classes at a local community college or technical school" (Filipczak, 1993, p. 45). The goals of this youth apprenticeship program are:

1. To prepare non-college-bound students for skilled health care careers
2. To enrich high school instruction in science and mathematics through the development of project-based curricula which integrate learning at school and at the hospital
3. To address the pressing labor needs of the hospitals by producing skilled workers for occupations in short supply
4. To put in place the first component of a new, comprehensive school-to-work transition system for young people in Boston (Jobs for the Future, 1993, p. 50)

With the coordination of the Boston Private Industry Council, the hospitals join together to train high school students for 16 technical occupations, including radiological technologist, nuclear medicine technologist, physical therapy assistant, occupational therapy assistant, medical laboratory technician, medical secretary, histology technician, and emergency medical technician. As of the fall of 1993, 250 students had been enrolled in the program. The students are required to obtain associate degrees or credentials by

enrolling for 2 more years in a community college or a vocational-technical school. Project ProTech is designed to place students in about 20 post-secondary institutions throughout Boston, although there is not yet any formal articulation agreement. At the completion of the program, a youth apprentice would receive a skills certificate in a particular technical specialty from the hospital.

The requirements for admission into the program include (a) some interest in a health care career; (b) an overall C grade point average in all school coursework; (c) a C- in the core subjects of mathematics, science, and English; and (d) an 85% school attendance record. However, the number of students who meet these requirements is still alarmingly small in the participating schools. Project ProTech targets the "neglected majority" of the high school population--those likely to complete high school but not to pursue college-level education without a supported pathway (Jobs for the Future, 1993, p. 50).

Since Project ProTech focuses on health care, students enrolled in the program take mathematics, science, and English courses adapted to the needs of the program in the last 2 years of high school. "The math class, for example, stresses metric measurements because students use metrics constantly in the labs at work" (Filipczak, 1993, p. 46). A set of common educational courses developed by teachers and hospital staff, with the help of World Education, Inc., introduces students to the specialty-related theoretical concepts and technical skills. School teachers deliver the related technical instruction.

While they receive school-based education, beginning students explore different health care occupations and rotate through several departments of a hospital under the supervision of hospital mentors. At this stage, students work between 12 and 16 hours per week. "By the beginning of their senior year in high school, students usually commit

to one technical specialty" (Filipczak, 1993, p. 46). They continue to work in the department of their choice. Wages for youth apprentices increase over the years.

During the 3rd and 4th years of the program, most students work toward their associate degrees while still working a minimum of 10 hours per week. Their paid positions in the hospitals are directly related to their occupational choices. Depending on their need and level of achievement, students are "eligible for tuition reimbursement and scholarships from the hospital they work for--up to $2,000 per year" (Filipczak, 1993, p. 46). During the first 3 years, students are guaranteed full-time summer jobs by the hospitals. The hospitals give program graduates priority in hiring, in their chosen specialty or in a related field.

In a progress report, Jobs for the Future (1993) summarized a series of lessons that were learned from Project ProTech's initial design and early adjustments. They include:

1. To facilitate industry involvement, there needs to be an intermediary organization.
2. Industry-driven planning can fortify industry involvement.
3. School involvement on equal terms is critical.
4. Learning plans and curricula should be developed to support on-the-job training.
5. The quality of job placements would have a strong impact on student performance in the program.
6. Support for students at the workplace is very important.
7. Youth apprenticeship requires a commitment from schools to change, and the program design must include mechanisms to address obstacles to change within schools.
8. Developing a post-secondary component could be a challenging task.

9. Acceptance standards must balance program needs and target populations, and unrealistic expectations for youth apprenticeship programs should be avoided.

10. Youth apprenticeship could add to per-student costs for schools and requires a substantial up-front investment by participating businesses.

11. A youth apprenticeship program needs to be consolidated in a single school to simplify the coordination of school and work components and the delivery of support services.

Differences in Program Designs

While the duration of most youth apprenticeship programs is 4 years, which include the last 2 years of high school and 2 more years of post-secondary education, program length ranges from 2 to 6 years. For example, Wisconsin defines youth apprenticeship as a 2-year high school program which starts in the 11th grade after students have demonstrated satisfactory performance on the 10th Grade Gateway Assessment. Careers in Education and Pickens County Youth Apprenticeship Program are programs that last 6 years (Jobs for the Future, 1993).

Most models propose involvement of post-secondary institutions in youth apprenticeship training. However, there is some variation among different programs. A majority of the programs that involve post-secondary institutions offer associate degrees, and some, like the Maine system, give 1-year post-secondary credits. In Wisconsin, technical colleges are generally not part of the youth apprenticeship system, but youth apprenticeship graduates are permitted to obtain advanced standing into a technical college program or facilitated entry into a 4-year college (Jobs for the Future, 1993).

Schedules of school instruction and on-the-job training may be significantly different from program to program. In Georgia, the state youth apprenticeship legislation

stipulates that a youth apprentice must receive a minimum of 144 classroom hours of related academic instruction and a minimum of 2,000 hours of on-the-job training, but it does not specify how the two components should be scheduled. The state of Wisconsin has established a general design criterion that would allow 11th and 12th grade students to work 15 to 20 hours per week and supplement this part-time work experience with full-time summer employment. In the Maine system, 11th grade students generally spend 20 weeks at a vocational high school and 30 weeks training in a workplace, and 12th grade students go to school for 14 weeks and receive on-the-job training for 36 weeks (Jobs for the Future, 1993). Youth apprentices enrolled in Project ProTech are school students in the morning and trainees in the afternoon (DeParle, 1992).

While most youth apprenticeship systems are open to any students who meet certain entry-level academic requirements regardless of their high school program or "track," Oregon's youth apprenticeship legislation provides that to be eligible for a youth apprenticeship, a student must be enrolled in a vocational-technical program (Jobs for the Future, 1993). Some systems base enrollment qualifications on students' previous academic records and school attendance rates, and others, such as those in Maine and Wisconsin, on a 10th grade assessment of students' academic skills and other relevant abilities.

Although there seems to be a consensus that paid work must be a defining element of youth apprenticeship, one issue that is still being hotly debated in various states and at the federal level is whether a subminimum wage is an incentive for businesses to participate or whether it sends wrong signals to employers and young adults about the quality, responsibility, and expectations. Some in favor of subminimum wages for youth apprentices argue that apprenticeship is part of the student's education. Offering a good wage might attract students who are more interested in the money than in the educational

value of the apprenticeship but scare away employers. Youth apprentices are mainly learners and not skilled workers yet. Others point out that requiring participating businesses to pay at least a minimum wage strengthens business commitment to youth apprenticeship training. They will be more likely to take youth apprentices seriously and value their work (Apling, 1992, p. 40).

In practice, some programs use subminimum wages because they could point out to youth apprentices that taking a lower wage is a worthwhile investment in education. For example, youth apprentices in Broome County, New York receive a stipend that is below the minimum wage. However, states like Wisconsin do not accept the idea of subminimum wages in their programs. All youth apprentices in that state earn wages that are set at least as high as the minimum wage (Jobs for the Future, 1993). Massachusetts requires that an employer pay at least a minimum wage to students enrolled in any type of educational work program. The reason for such a requirement is that youth apprentices also produce products and services. The state of Maine has developed a distinct approach that makes the payment into fixed stipends payable across the year regardless of the number of hours a youth apprentice worked.

Counseling in schools is usually for college-bound students, and occupational counseling for youth apprenticeship is not yet a widely adopted practice in the United States. Where there is some pre-apprenticeship occupational counseling for non-college-bound students, it is generally provided by school-based counselors. The state of Maine, however, has adopted a different practice. In that state, occupation specialists from Jobs for Maine's Graduates--an employability skills and support program outside of the high school system--help 9th and 10th grade students learn about and select career opportunities. They also provide youth apprentices with information and support throughout the apprenticeship period.

Generally, youth apprentices are under employers' worker compensation coverage, and whoever pays the youth apprentice for the work is legally regarded as the employer of the young person and is responsible for all liabilities. Oregon's legislation on youth apprenticeship specifically states that employers shall provide workers' compensation coverage for youth apprentices. In Maine, the technical schools act as employers of youth apprentices and are, therefore, legally responsible for their compensations. The schools bill the employers for the hours each youth apprentice worked. This is structured into the program so as to avoid the disincentive of covered liabilities to employers. In Pickens County, South Carolina, youth apprentices working for very small employers who are unable to provide workers' compensations are covered under the State School Board Association's policy (Jobs for the Future, 1993, p. 187).

In general, the party responsible for transportation of youth apprentices to and from work is also liable in case of an accident. If the school is transporting youth apprentices, then the normal school bus coverage applies. The same is true if the employer does the transportation. Some programs have youth apprentices sign an up-front agreement stating that if a youth apprentice chooses to transport himself or herself, then neither the employer nor the school is liable. Others state, also under an agreement, that youth apprentices are responsible for their own transportation. In case of a student driving himself or herself to the workplace during the school day, there should be no differences in liabilities from students getting to school or extracurricular activities. Programs such as Project ProTech and Health and Bioscience Academy provide youth apprentices with a public transportation transit pass, which is paid by either the school system or the employer (Jobs for the Future, 1993, p. 186).

Arguments Against and For Youth Apprenticeship

One of the most frequently voiced criticisms of youth apprenticeship is that it forces students to make life-long decisions at an immature age. The argument is that students at age 16 or 17 are too young to have the mature ability to choose a career, even with adequate career counseling and parental guidance. It would be not only wasteful in time and money but harmful to a youngster for the rest of his or her life if the youngster makes an immature decision and later decides that the career is not what he or she really wants. Examples are often cited to show that American teenagers and young adults change jobs frequently and that even many college graduates are not capable of making such a difficult decision. Osterman (1980) demonstrated that American young adults who do not enroll in higher education move through an essentially aimless set of job changes until they finally land on a job that pays enough to be worth keeping. Some career development theorists explain this typical American pattern as a reflection of adolescents' inherent incapability of making long-term career commitments and count it as part of an exploratory stage of career development.

Adequate research-based evidence is not available to support the assertion that 16- and 17-year-old youngsters cannot, by nature, make appropriate career decisions. If there are some youngsters who cannot make mature decisions, it may not necessarily be age-related. It could well be that the American educational system does not encourage and help young people to decide their own future. Just as young people can become skilled workers with proper training, they will be able to make right decisions about their careers if they have the necessary encouragement and guidance from schools and parents at earlier ages. The Swiss and German analogies make it clear that "young people are fully capable of assuming what Americans view as adult work roles, provided that they have adequate education and training and that they are given the opportunity" (Hamilton, 1993, p. 11).

In today's America, the primary problem is not that young people are incapable of making correct career decisions; in fact, non-college-bound youth do not have any appropriate careers to choose from.

While completing a youth apprenticeship and then changing one's chosen occupation could be considered a waste of time and resources by some, it is also true that sitting in a classroom not learning anything or only learning what will not be used before it is forgotten is also a waste. Starting to learn the life-long skills of a skilled occupation at age 16 or 17 does no more harm than hopping from one dead-end job to another or idling in streets. It is highly likely that the majority of youth apprenticeship graduates may not want to change their jobs if their careers are highly skilled and decently paying. Additionally, the ability to socialize with adult workers is a also marketable commodity, and it comes only from workplace experience.

Concern has also been expressed that youth apprenticeship could lead to tracking students at an early age (Tifft, 1992). Although many advocates of youth apprenticeship define connection with post-secondary education as one of its essential elements, some people still suspect that youth apprenticeship would force students onto either a college-bound track or a vocational track in their early schooling and would close future career and educational options for many students.

If it is true that the majority of the future jobs in the United States will not require a baccalaureate degree (Commission on the Skills of the American Workforce, 1990), it would be only unwise or unrealistic to expect everyone to go to college. The problem of tracking cannot be easily solved unless, as in Switzerland and Germany, the distinction between "professions" and "occupations" is blurred and the status of "non-professional" skilled workers is improved. Since a nation's economy is not built only by college graduates, the contribution of "non-professional" skilled workers must also be highly

valued. Serious efforts to improve the status of skilled workers are probably more important than those to exclusively prevent tracking in schools. The fundamental objectives of youth apprenticeship are, in fact, to create promising careers for non-college-bound youth and to help them select and secure those careers.

Another criticism of youth apprenticeship is that such programs will always have trouble keeping up with technological changes in the workplace. They will train young adults in skills that will soon become obsolete. Commenting on other people's critiques, Harrington-Lueker (1993) remarked that rather than keeping pace with training for the future, youth apprenticeship would prepare young people for positions that are technologically behind the cutting edge. Opponents of youth apprenticeship believe that general education is intrinsically more valuable and offers more to help workers adapt to technological advancements (Lerman & Pouncy, 1990a, p. 71).

This criticism seems to be based on the questionable assumption that youth apprenticeship training can never be improved so as to keep abreast of technological changes. If other on-the-job training schemes can, there is no logical reason why youth apprenticeship training cannot. In fact, youth apprentices have a much better chance to experience the technological cutting edge in a workplace than in a schoolhouse. Furthermore, "new occupational skills usually build on old skills rather than replace them" (Lerman & Pouncy, 1990a, p. 72). Well-designed youth apprenticeship programs may teach an entire range of occupational skills that can be generalized and applied broadly. Employers know that as technology changes they have to provide continuing training to their workers; however, they are also aware that apprenticed skilled workers are easier to train and can accomplish different tasks with modest amounts of incremental training (Lerman & Pouncy, 1990a, p. 72).

Some critics worry that a costly national youth apprenticeship system would turn American schools into training centers for private businesses and divert much-needed resources from existing school programs (Harrington-Lueker, 1993, p. 26). Since hundreds of thousands of young people are leaving school without mastering the required basic academic knowledge and skills, school-based education should be given the financial priority, not work-related youth apprenticeship. Since youth apprentices would have less time learning the basic academic skills in schools, they will face even greater obstacles in career development.

There does not seem to be strong empirical evidence to support this contention, either. Even if youth apprenticeship training may be expensive, employers, not schools, are supposed to assume the bulk of the costs. While it is true that school districts may face costs associated with program planning and administration and may even cover students' transportation costs (Apling 1992, p. 39), the classroom instruction part of a program may not be more costly than existing school programs. The cost of coordinating a well-designed program between schools and workplaces may be reduced after the initial phase. Considerable economies of scale can be realized when there are sufficient students participating in a fully implemented program (Apling, 1992, p. 39).

More importantly, the nationwide back-to-basics strategy has failed to reduce high school dropout rates (Cremin, 1989). More time spent in school may not improve students' basic academic skills if they do not see a bright future associated with such schooling. Cognitive sciences have shown that relevant work-based experiential learning can reinforce the knowledge and skills imparted in the classroom, and vice versa. "On the job, the apprentice realizes the importance of academic knowledge and technical skills to performing the current job and advancing to better jobs. In turn, realizing that what is learned in school might have practical applications on the job motivates the apprentice to

work harder in school" (Apling, 1992, p. 23). Current school dropout rates indicate a dysfunction of many existing school programs. In fact, any efforts to "warehouse" school-weary youngsters are costly, valueless, and futile.

Some opponents of youth apprenticeship maintained that this training scheme will not provide equal opportunities in that it will not offer much of an improvement for at-risk youth in the United States (Bailey, 1993a). Schools will probably send their good students to the more desirable youth apprenticeship placements, and students with serious problems will not get access to apprenticeships. If youth apprenticeship becomes a program that is not accessible to at-risk students, then this initiative comes at the cost of greater inequality in service and opportunity.

In response to this indictment, Hamilton (1993) argued, "In order to serve disadvantaged youth effectively, apprenticeship must be aimed at the middle two quartiles rather than identified with 'youth at risk'" (p. 14). This position reflects the conclusion of Lerman and Pouncy (1990a) and Wilson (1987) in their characterization of youth apprenticeship. Youth apprenticeship aims at training young adults for gainful and productive employment in skilled occupations, and only qualified students should be recruited. Enrolling unqualified individuals would only stigmatize all participants and surely be a disincentive to employers who otherwise would be willing to provide apprenticeships for young adults. If the policy of enrolling qualified applicants could be considered as not providing equal opportunities, then probably all the existing American university and college programs should also be indicted for "discrimination."

"All applicants for an apprenticeship," Hamilton (1993) added, "but especially those who are disadvantaged by reason of their gender, race, ethnic background, family income, or disabilities, need careful preparation before recruitment and selection begin" (p. 15). Schools should provide them with adequate career education and counseling and

give special assistance to those who have not had a fair chance in the past. "The best way to improve equal access to apprenticeships is to improve schools so that all young people will have a chance to acquire the academic learning and the work habits they will need to be hired as apprentices and to benefit from the experience" (Hamilton, 1993, p. 15).

A number of critics of youth apprenticeship consider the current practices of American employers as an insufficient basis for the type of apprenticeship systems that have been proposed. This argument points to the fact that the Taylorist mass production system that supported much of the American post-World War II economic success has always been adjusting work to the presumed low skills of the workforce rather than upgrading the workforce so that it would be effective in a production system that required high skills (Bailey, 1993a, p. 7). As the legacy of past success with the mass production strategy continues to exert a powerful influence, most employers will cling to the traditional approach to production in which learning and training are not significant components of the workforce activities. Because little is known about the nature of learning that takes place on the job, there will be potential problems in a massive on-the-job training program for young adults (Bailey, 1993b, p. 16). American employers have paid and will continue to pay little attention to how on-the-job learning experiences would be designed, monitored, evaluated, and improved. Additionally, the United States has neither an ample supple of trained trainers to guarantee the quality of on-the-job training nor a formal career path for experienced workers to become qualified trainers (Finegold, 1993, p. 4). "In work groups with high turnover, almost-novices are training novices, a situation that violates models of good apprenticeship training" (Bailey, 1993a, p. 7). Moreover, a conflict between the student as worker and the student as learner would also render youth apprenticeship inefficient. Since "the American system of on-the-job training is called 'following Joe around'" (Dertouzos, Lester, Slow & the MIT Commission on

Industrial Productivity, 1989, p. 21), youth apprenticeship would merely expose young people to a job and is not likely to achieve the expected results (Bailey, 1993a, p. 7).

Many supporters of youth apprenticeship do not agree with that conclusion. Hamilton (1993) indicated that knowledge about work-based learning is well established by proponents of cognitive apprenticeship. A certain amount of knowledge about on-the-job learning is already available. The substantial German literature on the topic of apprentices' work-based learning provides fundamental principles and findings that can be adapted to the United States. It is both unrealistic and destructive to criticize the beginning youth apprenticeship movement for not having established a solid base of research in work-based learning and an efficient structure of on-the-job training. "The distance between where we are and where we need to go should not deter anyone from beginning the journey" (Hamilton, 1993, p. 13).

The fundamental reason why youth apprenticeship is criticized as an impracticable workforce training strategy is perhaps that, under the current conditions, American employers have little incentive to participate (Bailey, 1993b, p. 17; Finegold, 1993, p. 3). Besides the major risk that trained employees will be hired away by competitors, most American employers do not seem to believe that young people would contribute enough to justify the efforts needed to train them. The negative view of youth held by American employers also stalls efforts to implement youth apprenticeship programs. Lower training wages is not a workable alternative, because "for most of the tasks that young apprentices would be doing in the United States, employers could get those tasks accomplished by low-wage workers hired directly from the labor market" (Bailey, 1993a, p. 7). Without employers' participation, youth apprenticeship is doomed to failure. Government funding alone will not be able to sustain a national youth apprenticeship system in the long run.

Getting American employers committed to youth apprenticeship is, indeed, a daunting task. It was listed by Jobs for the Future (1993) as one of the top two program implementation obstacles. Advocates of youth apprenticeship, however, generally seem more optimistic about employers' willingness to be involved in this new training scheme. Rosenbaum (1992) cited the existing school-business partnerships as an indication of employers' potential interest in youth apprenticeship. Hamilton (1993) maintained that employers will find it to their advantage to train technician-level workers by means of youth apprenticeship. Campbell et al. (1993) contended that because businesses have reasons to believe that training young people is the best way to ensure a steady supply of skilled workers, they would voluntarily participate despite the costs. The specific reasons provided included:

1. Employers are free to select and take on the number of youth they want, without government interference, and do not have to pay them as much as they pay experienced workers.

2. Training costs can be deducted from revenues before taxes.

3. A well-trained workforce can maintain and increase a business' performance and competitiveness.

4. The chance to observe and evaluate students under actual working conditions before offering permanent jobs eliminates the expensive and risk-ridden process of recruiting skilled workforce.

5. A business would have good standing in the community through offering workforce training for young adults (pp. 7-8).

Since youth apprenticeship often targets the industries and occupations in which skilled workers are in great demand, there may be more employers willing to invest in their communities and provide apprenticeships for young adults than is generally believed.

Furthermore, to encourage participation in training youth apprentices, a number of incentives for employers have been proposed. Among them are (a) levying a training tax for employers who do not spend a specified percentage of their salary costs on youth apprenticeship training (Bailey, 1993a), (b) transforming part-time slots into youth apprenticeships (National Alliance of Business, 1992), and (c) screening students prior to apprenticeship for their abilities and interest in the occupation (Glover, 1983).

Major Implementation Issues

The uncertainty and change required to implement youth apprenticeship programs may constitute a threat to current educational practices. Substantial occupation-specific on-the-job training raises questions about the major roles of traditional vocational-technical education teachers and guidance counselors (Apling, 1992, pp. 34-35). Vocational-technical education teachers are expected to resist the youth apprenticeship movement if they have to concentrate on lower skill occupations that are not included in youth apprenticeship programs or if they find that their programs will phase out altogether. Many of them will not be willing or able to accept a changed role of providing related instruction for employer-provided on-the-job training. Potential resistance will also come from guidance counselors mainly because "they know little about the world of work" (Apling, 1992, p. 35).

Many school teachers and principals perceive youth apprenticeship as being pushed by people outside of schools, such as business leaders and other advocates of economic development. They resent the idea that "outsiders" could tell them how to fix the educational system. They are fully convinced that active, relevant learning can always take place in the classroom, and youth apprenticeship would do more harm than good to

young people. In schools, youth apprenticeship is often viewed as in negative competition with existing school programs.

In some youth apprenticeship programs, academic and occupation-related instruction is provided not in the students' "home" schools but in separate facilities. Many people argue against this practice for its potential disadvantages: (a) it would make youth apprentices feel less a part of their high school and its extracurricular activities; (b) transportation to and from a separate location adds to the cost of a program; and (c) a separate program can stigmatize participants as inferior to those that remain full time at their "home" schools (Apling, 1992, p. 36).

Youth apprenticeship requires significant employer commitment; however, many employers in the United States still see few immediate benefits of this training strategy to their companies. They lack interest in training young adults because (a) they do not believe young adults are mature enough to be trainable; (b) they do not intend to re-organize their jobs on a high-skill, high-wage basis; (c) competitors can refuse to participate in training and simply hire the apprentices once they have completed training other companies provide; (d) short-term returns may not be obtainable; and (e) costs and liabilities may be too high. Policy makers of many states are concerned that an insufficient number of employers are changing their technology and work organization in ways that will demand more skilled workers, but do not know how they can encourage employer participation.

A large number of labor union leaders and members have expressed the concern that employers will use youth apprenticeship as a source of lower-paid, non-union workers. They fear that youth apprenticeship may give young adults jobs that might otherwise go to dues-paying adult workers, thus jeopardizing union members' interests. Even in some industries in which traditional apprenticeship is not a major training strategy,

youth apprenticeship faces the same level of resistance from labor unions. Where youth apprenticeship programs are initiated, many labor unions insist that youth apprentices not be allowed to do the same type of assigned job as for a full-time worker and to run production machinery without the supervising worker's presence. With strong resistance from organized labor, it will be extremely difficult for youth apprenticeship programs to achieve their fundamental goals and objectives.

For youth apprenticeship to be a superior way to prepare young adults for skilled occupations, there must be governing regulations and standards at the national, state, or even regional level. The regulations and standards should provide guidelines for youth apprenticeship providers as they develop specific training plans and conduct and evaluate their programs. Many states are not yet sure about what those standards should include in a complex range of industries and occupations, nor do they know for sure yet how the standards can be both broadly defined and attractive to employers. Standards that encourage training only in narrow, non-transferable skills that may soon become obsolete will be detrimental to youth apprenticeship, but standards that cover all aspects of an occupation may be a disincentive to many employers. According to Apling (1992), all the major stakeholders such as businesses, labor unions, educational institutions, and the government must be involved in the standards-setting process. Lerman and Pouncy (1990b) discussed the effective German standards-setting model. However, how well that model could be adapted to the United States is still unclear.

Apprenticeship Systems in Switzerland and Germany

The importance of apprenticeship as a workforce development strategy as well as an outlet for compulsory education completers is not the same among various European

countries. For example, in countries like France and Ireland, apprenticeship does exist, but it is secondary to school-based general and vocational education programs and to direct entrance to employment. Apprenticeship in Scandinavian countries remains on a very limited scale, and other forms of vocational training and school-to-work transition have been developed by public policy, primarily with a view to creating more equitable opportunities in education and employment. Belgium and Spain are among the countries where apprenticeship is almost non-existent. Switzerland, Germany, and Austria are three European countries in which apprenticeship is the single most important training activity of young people after the completion of general compulsory education (Organisation for Economic Co-operation and Development, 1979).

The apprenticeship systems in Switzerland and Germany are unique in many important aspects, including the legal framework and administrative structure, the concept of apprenticeable occupations, the level of direction and control by employers, the responsibility of labor unions, the role of government, the average age of apprentices, the limitation on the ratio of apprentices to skilled workers, the emphasis on related theoretical instruction, and the amount of general education for apprentices. In these two countries, the relationship between business and education is well-defined by both law and custom. Their dual systems particularly interest American workforce development professionals and policy makers.

Despite the fact that very distinct economic, educational, and cultural systems operate in Switzerland and Germany, these two countries hold a wealth of experience in education and vocational training upon which the United States can and should draw. "America needs to look beyond its borders to learn about the educational and training endeavors of our competitors if we are to improve our standing in the global economy" (Campbell & Armstrong, 1993, p. 6). Switzerland and Germany were selected for review

not only because they have the best workforce training systems in the world but also because they exhibit attributes conducive to adaptation by the United States. These attributes include (a) a healthy economy, (b) a democratic government, (c) a capitalistic economic system, (d) a national workforce training policy, and (e) a culture similar to that of the United States.

Switzerland

Vocational training in Switzerland is mainly in the form of apprenticeship. After the completion of 9 years of compulsory schooling at the age of 15 or 16, the vast majority of Swiss young adults enter vocational training (Benglen, 1989, p. 2). Sixty-five percent of all compulsory education graduates enter the traditional dual system of apprenticeship, and 9% enroll in full-time apprentice schools. Only "17% attend grammar schools to prepare for university admission exams, and 7% enroll in continued general education schools and teacher training programs" (Cheek & Campbell, 1994, p. 122). Fewer than 2% enter the labor market while attending part-time vocational schools, and no more than 1% find employment and choose not to attend post-compulsory training of any kind (Berger, 1988, p. 20). Apprenticeship remains open for post-compulsory general education completers and those who take a break before entering vocational training. Because of the high standards set by vocational schools and the keen competition for certain occupations, some apprenticeships are all but reserved for applicants who successfully complete the grammar school.

In Switzerland, skilled workers are highly respected, and vocational training is a serious economic venture, conducted in accordance with rigid, nationally specified standards. Because educational programs for students with special needs are separate from other forms of education, almost all compulsory education completers, called school

leavers in Switzerland, have the capacity required to learn a skilled occupation through a rigorous vocational training scheme. As a result, vocational training is not "watered-down" to meet the special needs of any individual (Campbell & Cheek, 1991).

Empowered by the Swiss Federal Constitution to legislate concerning vocational training in industry, trade, commerce, agriculture, and home economics, the Swiss Confederation (federal government) enacted the Federal Law on Vocational Training in April 1978. Apprenticeships, in particular, are governed by this law, which provides the "framework" regulations for 270 different skilled occupations. The Division for Vocational Training of the Swiss Federal Office for Industry and Labour "is the specialized Federal authority that implements the Federal Law on Vocational Training" (Swiss Federal Office for Industry and Labour, 1988, p. 17). As the Confederation's official representative regarding vocational training (Egger, 1984, p. 30), this governmental agency has the responsibility for developing uniformity of training. The various functions performed by the Division for Vocational Training include:

1. Drafting new and adapting existing vocational training regulations with advice and comments from cantonal authorities and interested organizations
2. Developing curricula for vocational training
3. Negotiating vocational training matters with appropriate occupational associations and labor unions
4. Working out, with other concerned parties, regulations governing "introductory courses" and solving organizational and financial problems associated with conducting these courses for apprentices
5. Training experts to officiate at apprentices' final examinations
6. Adapting apprenticeship to the requirements of modern society and economy

7. Supervising vocational schooling through inspecting and advising industrial, trade, and commercial schools; artisans' training establishments; and commercial colleges

8. Determining the minimum scope and content of the training for "vocational tutors"

9. Organizing refresher and upgrading courses for instructors at commercial colleges

10. Contributing in an advisory, coordinating, or supervisory capacity to the establishment and operation of further training facilities (Campbell & Cheek, 1991; Swiss Federal Office for Industry and Labour, 1988, pp. 17-18)

Among the approximately 240,000 trainees who are currently receiving training, about 200,000 selected an occupation which is subject to the Federal Law on Vocational Training. The others are receiving comparable training in such general occupational categories as agriculture, forestry, health, and federal government jobs (Benglen, 1989, p. 9). Such training is covered by other federal laws and regulations, which are implemented by different governmental agencies. For example, the Federal Office for Agriculture is in charge of vocational training in agriculture (Swiss Federal Office for Industry and Labour, 1988, p. 17).

In Switzerland, the Confederation, cantonal governments, and various occupational associations work together to establish the guidelines for vocational training (Campbell & Cheek, 1991). The Confederation lays down the "framework" regulations governing vocational training. To a very large extent, it delegates their execution to the 26 cantons. At the cantonal level of government, vocational training offices offer administrative services. By virtue of federal legislation, cantonal governments must work together to guarantee uniform implementation of enacted regulations (Campbell & Cheek, 1991). Occupational associations, to which the federal legislation confers considerable

responsibility, are important partners with the federal and cantonal authorities on vocational training. They have a major influence on the conception and changes of federal training and examination regulations and are granted direct executive powers in matters concerning "introductory courses." Employers, senior workers, and vocational school teachers are also consulted in the formulation and adaptation of vocational training regulations.

The Dual System. Almost two thirds of Swiss school leavers carry out their vocational training in the traditional way. This scheme combines employer-sponsored apprenticeship training in a private or public business with compulsory classes at a government-supported vocational school. The term 'dual system' is used because the two places, enterprise and school, cooperate with the common aim of providing quality training. Thanks to the cooperation among employers, vocational schools, occupational associations, and cantonal/federal governments, Switzerland has a very effective and efficient apprenticeship training system.

Prior to an apprenticeship, a contract is drawn up in conformity with the Swiss Code of Obligations. It must be signed by the employer, the apprentice, and the apprentice's legal representative. It is then submitted to the responsible cantonal authority for approval and registration. A business must fulfill certain requirements before it is authorized to train apprentices (Benglen, 1989, p. 7). One of the important requirements is that the "vocational tutor" of the business must possess the occupational capabilities and personal qualities necessary to instruct apprentices on the job or in a special training workshop. Violators of an approved contract, including apprentices who abandon the apprenticeship after a probationary period, are penalized (Dickey, 1981, p. 19).

The typical apprenticeship training period is 2 to 4 years. During this period, the apprentice receives practical training within the business under the guidance of a

"vocational tutor" or a *meister*. Traditional apprenticeship training is conducted in three different settings:

1. Small businesses where a *meister* has, in addition to other employees, one or two apprentices and trains them on the job

2. Large companies where many apprentices are trained on the job by "vocational tutors" or *meisters*.

3. Special training workshops where apprenticeship training is separate from production (Campbell & Cheek, 1991; Steiner, 1983, p. 1)

Most of the traditional apprenticeship training is provided on the job. Because training is closely linked to production, its costs are reasonable (Cheek & Campbell, 1994, p. 124). In the French-speaking part of Switzerland, there is a tendency toward the use of special training workshops. In this setting, apprenticeship training is away from the production area, and apprentices do not have production work assignments. Both the on-the-job and the off-the-production training schemes are considered important investments in the competency of Switzerland's workforce and the prosperity of the nation.

Regardless of the training setting, the regulations for vocational training must be followed, and all apprentices must be trained by "vocational tutors" or *meisters*. A business that chooses to provide apprenticeships must methodically train the apprentices in a broad range of occupational knowledge and skills. Those who fail to adhere to the prescribed outlines for training and do not properly train apprentices are subject to fines and other penalties (Cheek & Campbell, 1994, p. 123). In Switzerland, the training efforts of all businesses must conform to regulations, so that all apprentices receive the necessary work experience and become totally prepared workers. The content of practical training within a company is specified for all of the 300 or so different occupations in the corresponding sets of federal vocational regulations. When an occupation is a particularly

regional one, the cantonal authorities may also be permitted to develop the vocational regulations (Campbell & Cheek, 1991).

Apprentices are paid modest apprenticeship wages on a progressive scale, regardless of whether they are receiving training in the business or attending a vocational school or "introductory courses." Apprenticeship wages vary depending on the occupation. Apprentices also enjoy the same insurance and benefits, including a 5- or 6-week paid annual vacation, as those offered to any other regular employees. The cost of training within the business, as well as part of the cost associated with the "introductory courses," are paid by the employer (Benglen, 1989, p. 7).

Vocational training within a business has sometimes been criticized for its lack of systematic organization and delivery. An on-the-job apprenticeship training program may be exclusively linked with and entirely driven by the production or service process in which the company is involved at any one time. Thus, apprentices may not be able to learn the necessary basic and up-to-date work techniques which constitute the whole range of skills required for an occupation. In order to ensure that all apprentices learn the necessary basic skills and attain the required level of competence and experience, occupational associations organize and conduct a type of training known as "introductory courses." Under the guidance of the Division for Vocational Training, these courses last one to several weeks and are methodically conducted outside the business, usually in a vocational school or a facility chosen by an occupational association. The training company must send the apprentice to an introductory course each year during the apprenticeship (Campbell & Cheek, 1991). The federal and cantonal governments subsidize these courses (Benglen, 1989, pp. 5 & 7). Usually 50% to 60% of the total operating budget for introductory courses comes from government funding, and the balance is supplied by involved companies.

All apprentices are required to attend a tuition-free part-time vocational school, which is an integral part of the apprenticeship training, for at least 1 day per week. Three fifths of the school curriculum is directly connected with the apprentices' chosen occupations, while the remainder is devoted to such general education courses as language(s), social studies, commercial law, business, economics, civics, correspondence, and sports (Benglen, 1989, p. 7; Dickey, 1981, p. 19). The occupation-related instruction is further divided into practical and theoretical lessons. All instruction is based on the instructional outline contained in the apprenticeship regulations and the final examination syllabus (Benglen, 1989, p. 7). While the scope of the school-based learning, the subjects taught, and the number of lessons are determined for each occupation by the federal regulations which apply throughout the country, the cantons are responsible for organizing their own vocational schooling. The cantonal governments either operate these schools themselves or authorize local communes, businesses, or occupational associations to do so (Campbell & Cheek, 1991).

About 40% of the apprentices choose to spend an additional half-day each week taking available optional complementary courses. Those who need to "catch up" on their vocational schooling are permitted to attend supplementary classes for an extra half-day per week. Apprentices whose performance within the company and at the vocational school has reached required standards have the opportunity to take courses at advanced vocational colleges. Such colleges require entrance examinations, and admitted students study relevant subjects for a maximum of 2 days per week. At present, about 5% of the total number of apprentices take courses at those colleges (Benglen, 1989, pp. 7-8).

In spite of the many opportunities for vocational schooling, the law states that an apprentice must receive his or her training within the business for a minimum of 3 full days per week. While the possibility of taking additional courses does exist, this must be done

outside of working hours and with the permission of the vocational tutor (Campbell & Cheek, 1991).

Full-Time Apprentice Schools. One unique arrangement is the apprenticeship that is entirely school-based. This type of apprenticeship is regulated by the Federal Law on Vocational Training in the same way as the traditional apprenticeship system (Benglen, 1989, p. 9). A clear distinction is also maintained between practical training (50% to 60%), occupation-related classroom instruction (about 30%), and general education (10% to 20%). For example, in addition to the 800-hour-per-year practical training in a simulated industrial production environment, a typical apprentice in machinery mechanics would attend 20 to 24 classroom lessons (45 minutes each) every week. Apprentices who successfully complete the school requirements and pass the final apprenticeship examination receive the same status as those who go through the traditional business-school apprenticeship (Campbell & Cheek, 1991).

Many full-time apprentice schools set up well-equipped production enterprises, in which apprentices gain practical experience through manufacturing well-designed quality products. These products are sold on the open market for profit (Benglen, 1989, p. 9; Campbell & Cheek, 1991). Many of them are even marketable worldwide at competitive prices. While most of the program funding is covered by the government, the sale of manufactured items provides as much as one third of a school's budget.

Full-time apprentice schools are free of charge, but apprentices may not be paid any wages. The current annual cost of about $25,000 per apprentice is mainly devoted to providing the latest machinery, good working conditions, and qualified trainers and teachers. Because of the high quality of practical training in full-time apprentice schools, a large percentage of their graduates gain admission into polytechnic colleges. It was reported that 75% of the graduates in Winterthur and 95% in Berne go on to polytechnic

colleges to study the theoretical applications required of an engineer. Not research institutions with a collateral mission of education, Swiss polytechnic colleges work closely with employers to train applied engineers who are fully qualified to go to work.

Final Examinations. All apprentices trained in both the traditional and school-based systems must take and pass a final examination. The examination covers the practical skills acquired in the business or workplace and the theoretical knowledge learned in the classroom. Scores on the practical skills part usually account for two thirds of the total. Depending on the occupation, individual examinations take place over 3 or 4 days. The syllabus and length of the examinations are determined by federal vocational regulations; however, each canton organizes its own examinations. After a 6-month waiting period, either part of the examination can be taken a second time, if the first attempt was unsuccessful (Campbell & Cheek, 1991).

Working within the federal regulations for vocational training and examinations, representatives of occupational associations and vocational schools develop specific technical regulations governing final examinations for apprenticeships. As mentioned, personnel who officiate at apprentices' final examinations are trained by the Division for Vocational Training. "Examiners must possess the same qualifications as vocational tutors or teachers in vocational schools" (Benglen, 1989, p. 10).

Apprentices who pass the final examination are awarded the nationally recognized Federal Certificate of Competence (journeyman-level worker's certificate). This certificate protects the reputation of the occupation. It qualifies holders for employment in skilled occupations anywhere in Switzerland and, in many instances, is a prerequisite to advanced training (Benglen, 1989, p. 8).

Vocational Tutors. A "vocational tutor" is usually the head of a business or the designated employee responsible for training. All vocational tutors must have a Federal

Certificate of Competence in his or her own occupation. In many cases, a vocational tutor is required to have up to 5 years of work experience as a journeyman-level worker, have attended a *meister* school, and have passed the *meister*'s examination (Benglen, 1989, p. 10).

All vocational tutors must also complete a 40- to 50-hour course in training pedagogy. During this course, prospective vocational tutors spend a major portion of time studying the psychological aspects of young adult learning (Benglen, 1989, p. 10). While, as noted, the minimum scope and content are determined by the Division for Vocational Training, individual courses are organized by cantons or occupational organizations.

Vocational tutors have the overall responsibility for training apprentices in the business. According to the vocational regulations, vocational tutors can have their license withdrawn and even be prosecuted for failing to meet this obligation (Campbell & Cheek, 1991). Instructors teaching introductory courses must fulfill the same requirements as vocational tutors (Benglen, 1989, p. 10).

Vocational Teachers in Schools. There are two types of vocational teachers in part-time vocational schools: practical and theoretical. To meet the qualifications for a teacher of practical content, a person must have up to 5 years of practical work experience as a journeyman-level worker and must have achieved the *meister* status. This status is attained by (a) attending a *meister* school full time for 1 or 1 1/2 years or part time for 2 or 3 years and (b) passing a final examination. Most choose the full-time school because the part-time school is often more demanding and time-consuming (Campbell & Cheek, 1991). Subjects taught in a *meister* school include (a) advanced skills in and knowledge about the occupation, (b) management and supervision, (c) safety and environment

protection, (d) laws and regulations governing the occupation and vocational training, and (e) training pedagogy. The tuition is paid by either the trainee or the company, or both.

Theoretical teachers must be graduates of a polytechnic college; therefore, they are well-trained applied engineers. Since they had already served an apprenticeship prior to entering a polytechnic college, they have a good understanding of the relationship between theory and practice.

In Switzerland, teachers are held in high esteem and are well paid. Currently, the starting annual salary for teachers in Switzerland is SF100,000, which is about $65,000. In fact, Swiss *meisters* and engineers earn more when teaching in a vocational school than working in a business.

Career Guidance. From an early age, Swiss students are offered career guidance by schools. They receive classroom instruction on career preparation and attend classes of pre-apprenticeship as well as classes for further training. Prospective apprentices also have the opportunity to participate in a 5-week pre-apprenticeship program sponsored by an occupational association or an employer. At this experimental stage, a young person has a chance to become familiar with an occupation that interests him or her before making a career choice.

Occupation information centers, which are non-school-based cantonal agencies, offer career counseling services to young people and adults free of charge. Located in communities, these centers guide prospective apprentices in finding occupations which are compatible with their inclinations and aptitudes and allow them to develop as skilled workers. To facilitate services, these centers are equipped with a variety of media and apprenticeship-related information. By law, career advisors in these centers supply objective, impartial, and detailed advice and documentation to people who request them while encouraging them to make informed career decisions on their own. While they have

the exclusive responsibility to provide occupational counseling for prospective apprentices, these centers coordinate their services with schools at the request of teachers or parents (Benglen, 1989, p. 15; Campbell & Cheek, 1991). This outside-of-the-school occupational counseling system is particularly favored by Swiss businesses, occupational associations, schools, students, and parents.

Germany

Full-time compulsory schooling in Germany is 9 or 10 years. Following 4 years of schooling in a primary school, German students attend one of the four different types of secondary general education schools: (a) the 5-year *hauptschule* (secondary modern school), (b) the 6-year *realschule* (technical grammar school), (c) the 9-year *gymnasium* (grammar school), and (d) the *gesamtschule* (comprehensive school). After completing compulsory in-school education at the age of 15 or 16, about 15% of all German young adults attend a *berufsfachschule* (full-time vocational school), and approximately 70% enter vocational training in the dual system. Almost one third of all German secondary school students attend the *gymnasium*, but only about 50% of them obtain a grammar school diploma. Approximately 90% of grammar school diploma holders go directly to a university (Cheek, 1993, p. 24; Porter, 1986, p. 27). Those who do not obtain a grammar school diploma or enter a university may be admitted into a full-time technical and vocational school or an apprenticeship program in the dual system. Roughly 70% of the workforce in the former West Germany became qualified skilled workers through training within the dual system (Bednarek, 1990; Filipczak, 1992; Peak & Matthes, 1992). Of all the apprentices who receive vocational training within the dual system, about 38% come from *hauptschulen*; 32%, from *realschulen*; 15%, from *gymnasien*; and 15%, from

berufliche schulen (vocational schools). In Germany, apprenticeship is by far the major form of vocational training for young adults.

Compared to other industrialized countries, Germany has a much lower youth unemployment rate (Carl Duisberg Gesellschaft, 1991, p. 25). This is often attributed to the country's quality vocational training system for young adults (Marsden, Trinder, & Wagner, 1986). As a national economic priority, apprenticeship training is strongly supported by all parties involved: employers, labor unions, schools, governmental agencies, apprentices/students, and parents. Because of the dual system of vocational training, Germany is well-positioned to compete economically with other industrialized nations.

The Vocational Training Act of 1969, along with its amendments, provided the legal basis on which the workplace-based (apprenticeship), out-of-the-school part of the vocational training system was established. Classified constitutionally as labor and/or economic legislation, not educational legislation, this act entitles businesses to conduct such training. It stipulates that apprentices under age 18 can be trained only in occupations recognized by the federal government. The act also addresses the responsibilities of various institutions involved in apprenticeship training--the government, chambers, and employers (Krais & Krebstakies, 1983, p. 22). Training in the traditional crafts is governed by the Handicrafts Code. The Vocational Training Promotion Act of 1981 governs the planning and publication of statistics regarding vocational training and specifies the tasks of the Federal Institute for Vocational Training. The Youth Labor Protection Act makes special provisions for protection measures for youth apprentices and other workers. It requires the employer to grant apprentices sufficient time, without loss of wages, for compulsory attendance at a *berufsschule* (part-time vocational school), which is the other part of the dual system (Munch, 1986, p. 70).

The Dual System. In Germany, apprenticeship consists of two parts: on-the-job training and occupation-related vocational schooling. Responsibility for regulating the employer-provided on-the-job part of apprenticeship training rests, as noted, with the federal government. The *länder* (states) have responsibility for the school-based part. While there are differences in school-provided vocational education among the 16 *länder* of the unified Germany, broad principles are generally applicable throughout the nation (Federal Minister for Education and Science, 1992, p. 58; Krekeler, 1986, pp. 4 & 7). The term "dual system" is derived primarily from the fact that two entities--the business and the school--work together to achieve a common goal of training skilled workers. All German apprentices have a dual role--that of trainee in the workplace and that of student in the *berufsschule*.

Within the dual system, more training time is allocated to the workplace than to the school. Working in a company 3 or 4 days per week, apprentices acquire occupation-related, practical skills and paid work experience under the guidance of a qualified on-the-job trainer or a *meister*. Several advantages of workplace-based apprenticeship training have been identified:

1. The training takes place under actual working conditions and utilizes up-to-date equipment and facilities, thus enabling the program completer to become a qualified skilled worker immediately.

2. On-the-job instructors are constantly exposed to new technological requirements and can, therefore, integrate them directly into the apprenticeship training.

3. Since the training is largely conducted on actual productive work, apprentices are motivated to learn.

4. Because apprentices participate in production, training costs can be reduced (Federal Minister for Education and Science, 1992, p. 7).

Small and medium-sized companies are often not in a position to offer the complete range of apprenticeship training required by the regulations. However, for the areas in which they are not able to train, they can send their apprentices to supplementary training programs in (a) inter-firm training centers, (b) school workshops, and (c) other companies. Inter-firm training centers are operated by chambers and are subsidized by the government. Small and medium-sized businesses represent an important part of the German economy, and their participation in apprenticeship training is thus essential.

An important characteristic of employer-provided apprenticeship training in Germany is its market orientation (Campbell, 1993, p. 81). The supply of apprenticeships is determined by businesses' needs for skilled workers and their training capacities. The demand for training positions depends on the size of a given group of school leavers and their educational and career choices (Carl Duisberg Gesellschaft, 1991, p. 4). Both employers and prospective apprentices are free to choose each other. While the vast majority of apprenticeship applicants are able to obtain training positions (von Gilardi & Schulz, 1989, pp. 10-11), "during periods of high youth unemployment, less able youngsters may experience difficulty in obtaining apprenticeship in the preferred occupation or with the business of choice" (Campbell, 1993, p. 81). For those who have completed their general schooling but fail to obtain an apprenticeship within in the dual system, several other options are available. Among them is a 1-year full-time vocational training course known as the "vocational training foundation year." Because the training is mostly school-based and hardly occupation-specific, it is often regarded with suspicion. While time spent in this exploratory program is said to be applicable toward apprenticeship within the dual system (Raggatt, 1988, p. 166), many employers have (a) tried to avoid counting this year toward the apprenticeship period, (b) granted only partial

credit toward apprenticeship training, or (c) avoided hiring such program participants altogether (Haskell, 1993, p. 62).

Currently, there are about 2.6 million employers in Germany, and 97% of them have fewer than 50 employees. These small businesses employ more than two thirds of all German workers. Von Gilardi and Schulz (1989) found that approximately 63% of all apprentices received their training in businesses with fewer than 50 employees, about 22%, in businesses with 50 to 499 employees, and the rest, in businesses with 500 or more employees (p. 14). This finding indicated that most apprenticeship training takes place in small and medium-sized businesses. Roughly 51% of all apprentices are trained in businesses affiliated with the Chambers of Industry and Commerce, and 33%, in those associated with the Chambers of Crafts. The rest of them are in the sectors of medicine, architecture, public service, agriculture, and so forth (Carl Duisberg Gesellschaft, 1991, p. 17). In general, large industrial and commercial businesses train approximately the same number of apprentices as they expect to employ when the training is completed. The craft sector, on the other hand, trains more young people than can subsequently be hired as journeyman-level workers (Dougherty, 1987, p. 198).

The length of an apprenticeship is usually 3 or 3 1/2 years. Only about 10% of all the recognized skilled occupations require a period of 2 or 2 1/2 years (Carl Duisberg Gesellschaft, 1991; von Gilardi & Schulz, 1989, p. 9). On-the-job training is often divided into two phases: (a) training that is broad and basic to an entire occupational field or cluster and (b) training that is specialized for a particular skilled occupation. The 1st year of an apprenticeship is usually devoted to basic training, which covers the knowledge and skills essential for a field or cluster of skilled occupations. The specialized knowledge and skills necessary for a particular skilled occupation within the field or cluster are gained during subsequent years.

Examples of occupational fields include those of metalworking, building, and electrical occupations (Federal Minister for Education and Science, 1992, pp. 12-13). Each occupational field may consist of several occupations. "Basic training in the field (cluster) of electrical occupations," for example, "encompasses the fundamental knowledge and skills relevant to the eight skilled occupations assigned to this field" (Campbell, 1993, p. 83). Several major goals have been identified for the basic training year. They include:

1. Facilitating a smooth transition from school to work
2. Broadening the scope of necessary knowledge and skills and avoiding premature specialization
3. Improving the overall occupational competence
4. Enhancing the journeyman-level worker's job mobility (Campbell, 1993, p. 83)

In the dual system, *land*-provided part-time vocational schooling supplements employer-offered practical training. The education laws of the *länder* make the apprentice's attendance at a *berufsschule* compulsory if he or she is under the age of 18. The purpose of this type of school is twofold: (a) to provide theoretical background related to on-the-job training and (b) to improve apprentices' general education. In most German *länder*, *berufsschulen* are organized in five categories of vocational fields: (a) industrial technology, (b) commerce/business, (c) home economics, (d) agriculture, and (e) mixed occupations. Classes are organized according to individual occupations or occupational fields, and students are grouped by the year of apprenticeship.

Apprentices spend 1 to 2 days per week in the tuition-free *berufsschule* receiving general education as well as occupation-related technical instruction. Attendance at the *berufsschule* can also be arranged in the form of block releases, during which apprentices attend the school full time for up to several consecutive weeks at a time. Approximately

40% of the curriculum is devoted to general education subjects, such as German, social studies, economics, sports, and religion. The remaining 60% is composed of technical subjects related to the apprentice's chosen occupation (Federal Minister for Education and Science, 1992, p. 28). Curricula for *berufsschulen* are developed by the individual *länder* and are coordinated with the general training plans specified in the federal apprenticeship training regulations.

Typically, apprentices are required to maintain a training journal which consists of daily accounts of both on-the-job training and vocational schooling activities (Raggatt, 1988, p. 177). As an important evaluation means, the training journal must be submitted to a board of examiners as a prerequisite for taking the final examination (Krekeler, 1986, p. 32).

In addition to the acquisition of the necessary occupational knowledge and skills, a number of other advantages have been identified for the dual system. Journeyman-level workers who complete apprenticeship in this system usually have good higher-order cognitive skills, including (a) contextual thinking, (b) reasoning, (c) analytical and critical capabilities, and (d) creativity. In most cases, they are also able to:

1. Effectively communicate and cooperate with co-workers and supervisors
2. Rapidly learn new information and technology and apply them to work
3. Make work-related decisions on their own and with a high sense of responsibility
4. Cope with changing work-related challenges and stress (Carl Duisberg Gesellschaft, 1991, p. 27)

Training Regulations. All apprenticeships are federally regulated. With the approval of the Federal Ministry for Education and Science, authorities such as the Federal Ministries of Economic Affairs and Agriculture issue legally binding workplace-

based apprenticeship training regulations. For each federally recognized occupation, there is one set of regulations which specify, as a minimum, (a) the name of the skilled occupation, (b) the duration of training, (c) the knowledge and skills to be acquired as well as the minimum standards to be met, (d) an outline of the syllabus, timetable, and overall training plan, and (e) the examination requirements (Federal Minister for Education and Science, 1992, p. 14; Krekeler, 1986, p. 12; Raggatt, 1988, pp. 169 & 172). Businesses are responsible for training apprentices within the framework of the regulations. The aim of federal regulation is to ensure standardized employer-provided vocational training throughout the country (Federal Minister for Education and Science, 1992, p. 12). "Among other things, training regulations guarantee mutual recognition of qualifications, facilitate job mobility of completers (journeymen), and establish a uniform foundation for further vocational training" (Campbell, 1993, p. 87). Although they are trained by different companies, all German journeyman-level workers in a particular federally recognized occupation meet or surpass the minimum occupational proficiency requirements.

As technology, manufacturing processes, and work organization change, so do the apprenticeship training regulations. The procedure for preparing new and revising existing regulations involves employers' associations, labor unions, appropriate federal ministries, and the Federal Institute for Vocational Training. The initiatives for creating and revising regulations usually come from employers and labor unions. Advised by committees of experts representing the relevant occupational groups, the Federal Institute for Vocational Training prepares proposals for these regulations and coordinates all appropriate parties in finalizing new and amended regulations for apprenticeship training. The published regulations are often the result of both extensive research and careful balancing between different interests. These regulations are also coordinated with the *berufsschule* curricula

in each *land* (Carl Duisberg Gesellschaft, 1991, p. 31; Federal Minister for Education and Science, 1992, p. 14; von Gilardi & Schulz, 1989, p. 9).

German businesses are not compelled to train apprentices, nor are trained apprentices obligated to remain with the companies that have trained them. However, about 25% of all businesses which are members of the Chambers of Industry and Commerce and 50% of those affiliated with the Chambers of Crafts are approved to carry out apprenticeship training (Nothdurft, 1989, p. 35). This represents about 500,000 businesses, which account for roughly 60% to 80% of all German employees (Krekeler, 1986, p. 7). "By assuming the responsibility for work-based training, business and industry at large have made a commitment to provide training openings in sufficient numbers in order to cater for future generations" (Carl Duisberg Gesellschaft, 1991, p. 21). German businesses provide apprenticeship training voluntarily and regularly at their own expense because they believe that this is the best way to secure for themselves a steady supply of skilled workers with reliable credentials. Although companies are under no legal obligation to retain trained apprentices as part of their permanent workforce (Raggatt, 1988, p. 170), the majority of apprenticeship completers are subsequently employed by the businesses that have trained them. With the skilled worker credentials recognized and respected throughout Germany, those who are not employed immediately have a much better chance than non-apprentices to be hired by other employers or work in related occupations.

Currently, there are 373 federally recognized occupations which require formal apprenticeship training. This number does not include health and child care occupations. In 1971, there were as many as 606 recognized occupations requiring such formal training; however, the decrease in number does not mean that fewer apprenticeships are available today. Instead, closely related apprenticeable occupations have been combined (Haskell,

1993, p. 56); thus, training has become broader and more comprehensive (Federal Minister for Education and Science, 1992, p. 12).

Qualifications for and Responsibilities of Training Employers. All businesses that are interested in training apprentices must bear the associated costs. In addition, they must have qualified training personnel and be able to provide adequate facilities, equipment, and tools. The production or service work must be appropriate for facilitating training in the prescribed knowledge and skills. The suitability of a business to offer apprenticeship training is determined by a chamber on the basis of whether such qualifications are met. Appropriate chambers at the regional level closely supervise training and monitor continuous compliance with the standards (Carl Duisberg Gesellschaft, 1991).

According to the Vocational Training Act, a training employer must also:

1. Ensure that the apprentice presents a certificate of the required medical examination
2. Ensure that the knowledge and skills necessary for the achievement of training objectives are imparted
3. Ensure that the apprentice acquires the necessary on-the-job experience
4. Divide up the course of training according to the general training plan and draw up a specific training schedule
5. Train the apprentice or appoint a qualified trainer to do so
6. Ensure that the apprentice attends the *berufsschule* and keeps a training journal
7. Care for the apprentice and promote his or her character (Campbell, 1993, p. 86)

Apart from the emphasis on skill building and craftsmanship, the German apprenticeship allows young people to mature and build self-esteem under the tutelage of a mentoring adult. Consequently, apprenticeships not only prepare German youngsters for a skilled occupation but also facilitate their transition to adulthood.

Trainer Qualifications. By law, on-the-job apprenticeship training is conducted only by *meisters* or in-company trainers who hold a credential known as the Training Aptitude Certificate. A *meister* certificate is sufficient proof that the holder has acquired the occupational skills and instructional qualifications necessary for a qualified trainer. The *meister* status is usually achieved as a result of (a) a minimum of 2 years of practical work experience as a journeyman-level worker, (b) 1 to 1 1/2 years of full-time coursework or 3 years of part-time coursework at a *meister* school, and (c) passing of a final *meister* examination.

Typically, there are two categories of *meisters*: *handwerksmeister* (master in a craft trade) and *industriemeister* (industry master). Training of both types of *meisters* is rigorous and extensive. *Handwerksmeister* training usually consists of four parts: (a) occupational practice; (b) occupational theory; (c) commerce, law, and accounting; and (d) training pedagogy. *Industriemeister* training is divided into three content areas: (a) management and supervision, (b) technical theory, and (c) training pedagogy. Pedagogical training is the same for both the *handwerksmeister* and the *industriemeister*. Its four major components are (a) basic issues in vocational training, (b) planning and implementation of training programs, (c) young people undergoing training, and (d) legal basis of vocational training (Flower & Russell, 1982, p. 22). The syllabi for *meister* training are designed and approved at the national level. *Meister* examinations are organized by appropriate chambers. While the minimum age to become a *meister* is 24, in actual practice, most journeyman-level workers who become *meisters* do not attain this

status until they have at least 5 years of post-apprenticeship practical work experience and are about 30 years old (Raggatt, 1988, p. 171). *Meisters'* role in apprenticeship training has been and will continue to be pivotal (Raggatt, 1988, p. 171).

The Training Aptitude Certificate is issued to those who have passed a training qualification examination. This examination can be taken by journeyman-level workers when they have a minimum of 2 years of post-apprenticeship practical work experience in the occupation. It is usually part of a *meister* examination and invariably includes the pedagogical elements. In-company trainers who hold the Training Aptitude Certificate are registered with the Chamber of Industry and Commerce, the Chamber of Crafts, and other similar competent bodies.

While the trainer-trainee ratio varies depending on the occupation and the type of training, a *meister* or Training Aptitude Certificate holder usually provides on-the-job training to no more than three apprentices at a time in addition to performing other job tasks. The purpose of this practice is to ensure that the trainer will have enough time for supervised training and that all apprentices will be trained in an adequate manner.

Competent Bodies. Such institutions as the Chamber of Industry and Commerce, the Chamber of Crafts, the Chamber of Agriculture, and other similar organizations are defined by the Vocational Training Act as competent bodies regarding apprenticeship training. The act delegates the following apprenticeship-related tasks to these organizations:

1. Determining whether businesses and trainers have the necessary qualifications to train apprentices
2. Registering apprenticeship contracts
3. Advising and providing assistance to businesses on apprenticeship training matters

4. Overseeing on-the-job training
5. Monitoring compliance with the national standards for apprenticeship training
6. Promulgating training regulations
7. Serving as information centers and complaints offices for apprentices
8. Establishing boards of examiners
9. Issuing rules to be observed in administering final examinations
10. Administering interim and final examinations
11. Certifying apprentices who have passed the final examination
12. Establishing and operating inter-firm training centers
13. Operating *meister* schools and craft/trade academies
14. Conducting in-company trainer and *meister* examinations (Campbell, 1993, p. 91; Carl Duisberg Gesellschaft, 1991, pp. 26-27; Krekeler, 1986, p. 19)

Chambers are self-governing, non-profit organizations organized under public law. Every German private business must be a member of a chamber in its region and pay an appropriate membership fee. A chamber is governed by an elected plenary assembly, but it is also legally supervised by a federal agency such as the Ministry of Economic Affairs. Chambers are subsidized by the government in their operations. They receive about 65% of their inter-firm training costs from the federal government and 10% to 15% from the *land* in which they are located.

Each chamber has a vocational training committee which is composed of representatives from (a) employers' organizations, (b) local labor unions or independent workers' associations, and (c) *berufsschulen*. Teachers from *berufsschulen*, however, serve in an advisory capacity and are not entitled to vote (Krekeler, 1986, pp. 18-19; Russell, 1984, p. 7). "The vocational training committee makes recommendations to the chamber, but it is also a decision-making body with responsibility for the statutory

regulations dealing with practical implementation of apprenticeship training" (Campbell, 1993, p. 92). In addition to providing advice and assistance to businesses on all kinds of training matters, the committee may take corrective actions if a business fails to train apprentices according to the specified standards. Such actions may include (a) moving apprentices to other businesses, (b) sending apprentices to inter-firm training centers for supplementary instruction, and (c) rotating apprentices among several businesses (Campbell, 1993, p. 95).

Examinations. The Vocational Training Act requires that all apprentices take at least one interim and a final examination. The interim examination determines how well the apprentice is progressing in acquiring the knowledge and skills. The final examination determines whether all the required occupational qualifications have been attained. Examination requirements are outlined in the apprenticeship training regulations for each recognized skilled occupation and are specified in individual apprenticeship contracts.

In order to examine an apprentice, the responsible chamber appoints a board of examiners, which consists of an equal number of representatives from both employers' and employees' organizations and at least one teacher from a *berufsschule*. All board members must be recognized experts in the apprentice's occupation. The board of examiners develops, administers, and grades the final examination. The chamber's vocational training committee issues examination rules, which specify the (a) conditions of admission, (b) form of the examination, (c) grading criteria, and (d) provisions regarding violations of the rules.

Typically, the final examination includes a written part and, in some cases, an oral part as well. The written portion, which usually lasts about 8 hours, tests the apprentice's theoretical knowledge about the technology of the skilled occupation and covers a wide variety of closely related areas. In the vast majority of the recognized occupations,

apprentices are also given "hands-on" performance tests which typically require production of a "journeyman piece" and completion of a work sample. A technical drawing of the "journeyman piece" must be approved by the board of examiners before production can begin. An apprentice who does not successfully pass all parts of the final examination may be reexamined in the failed parts at a later date, but the maximum number of attempts allowed is usually three (Carl Duisberg Gesellschaft, 1991, p. 8; Raggatt, 1988, p. 20).

Chambers issue certificates to those who pass the final examination. Recognized throughout Germany, this certificate indicates that the apprentice has acquired all the qualifications necessary for a specific skilled occupation and has thus attained the status of a *geselle* (journeyman-level worker in a craft), *facharbeiter* (skilled worker), or *fachangestellter* (specialized clerk). This status is the basis for job mobility and career advancement. The attainment of this status is not the end of a worker's training; rather, it is a requirement for admission to *meister* and other further training programs (Campbell, 1993, pp. 94-95). Approximately one quarter of all those who have achieved this status eventually become *meisters* (Flower & Russell, 1982, pp. 6-7).

Apprenticeship Contract. The apprenticeship relationship is formally established by a written contract signed by the employer, the apprentice, and the apprentice's legal representative if the apprentice is a minor. Apprenticeship training cannot begin before a contract is signed. The contract must be examined by the appropriate chamber and subsequently entered in its register. The content of a contract is based on the training regulations for the skilled occupation being pursued and on the specific training schedule prepared by the company according to the general training plan. According to the Vocational Training Act, an apprenticeship contract must specify, at a minimum, the following details:

1. The occupation for which training is to be provided
2. The nature, content, organization, and objectives of the training
3. The starting date and length of the training period
4. The training to be done outside the business (e.g. in an inter-firm training center or another company)
5. The length of the normal training/working day
6. The duration of the probationary period
7. The amount of wages and the manner of payment
8. The number of annual leave days
9. The provisions governing contract termination (Carl Duisberg Gesellschaft, 1991, p. 34; Krekeler, 1986, p. 8; Raggatt, 1988, p. 169)

Every apprenticeship contract has a probationary period. This period must be at least 1 month but not more than 3 months in length. During the probationary period, the apprenticeship contract can be terminated by either party at any time. It is, however, binding after this period has expired (Campbell, 1993, p. 85). Only in exceptional circumstances can the training relationship be terminated.

Apprenticeship Wages. Apprenticeship wages vary between occupations. The Vocational Training Act provides general guidelines for determining apprenticeship wages. However, the actual amount of pay for a certain skilled occupation in a particular area is based on a minimum level settled through negotiations between employers' associations and labor unions in a specific branch of industry and/or collective bargaining district (Carl Duisberg Gesellschaft, 1991, p. 34). German apprentices are paid moderate wages, which are raised on an annual basis according to the apprentice's age and training progress (Federal Minister for Education and Science, 1992, p. 11). Although their wages

are sometimes lower than those for unskilled factory jobs, German apprentices can expect significantly higher salaries once they become journeyman-level workers.

Qualifications for Berufsschule Teachers. In *berufsschulen*, there are two types of teaching staff: (a) teachers of theoretical courses and (b) teachers of practical content. The first type of teachers are employed to teach occupation-related technical subjects as well as general education courses. They deliver theory primarily with the aid of books and chalkboards. As previously indicated, a *berufsschule* is usually categorized as one of the five types. Technical subjects in an industrial type of school often include metalworking, electrical engineering, chemical engineering, building, and textiles and clothing. Technical subjects in the commercial category are business related, and such courses prepare young people for careers as accountants, salespersons, bank clerks, administrative specialists, assistants to economic advisors, and the like (Craig, 1993, p. 154). Theory teachers normally follow a rather traditional teacher education program at a university and must meet the following qualifications:

1. Having obtained a university degree (a minimum of 8 full terms of higher education) with a major related to the teaching position

2. Having completed training in pedagogy and classroom instruction while receiving a university education

3. Having completed a 1- to 2-year practicum during or after the university education (in addition to the 8 terms)

4. Having completed 1 1/2 to 2 years of training as practice teachers in a *berufsschule* (Carl Duisberg Gesellschaft, 1991, pp. 33-34; European Centre for the Development of Vocational Training, 1983)

Teachers of practical content are usually laboratory or workshop instructors. They often work closely with theory teachers, and their instruction is more experiential. They

teach by demonstrating actual work-pieces, explaining with the aid of such pieces, and guiding students in the hands-on use of equipment, tools, and materials. These teachers generally pursue an 18-month in-service teacher training course. Prerequisite training for teachers responsible for the practical part of the instruction includes successful completion of:

1. Secondary schooling at or above the *realschule* level
2. *Meister* training and examination or training in an advanced technical school for a minimum of 3 terms or 1 1/2 years
3. At least 2 years of practical work experience as a journeyman-level worker (Carl Duisberg Gesellschaft, 1991, p. 34)

Berufsschule teachers are well-paid, highly respected civil servants. Their conditions of employment and standard of living are governed by law (Krais & Krebstakies, 1983). Since teaching in a *berufsschule* is viewed as a prestigious job, teachers are selected very carefully, and their training is both thorough and rigorous. Prior to entry into the teaching profession, *berufsschule* teachers must take and pass a comprehensive teaching qualification examination (Haskell, 1993, p. 72). After 5 years of service, they can become tenured. Once tenure is granted, teachers cannot be laid off without good cause and may continue to teach until age 65, at which time they retire with a pension (Craig, 1993, p. 152).

Career Education and Guidance. The German school program that addresses career awareness, orientation, and exploration is called *arbeitslehre* (the world of work). Although the exact meaning of this generic concept varies among the various *länder*, the overall aims and objectives of *arbeitslehre* are to (a) orient students to future careers, (b) impart basic insights into modern technical, economic, and socio-political lives, and (c) impart fundamental knowledge and skills in the fields of technology and economics. In

different *länder*, the *arbeitslehre* program may have similar units or content organizers. Some of the more common ones include:

1. Introduction to employment
2. Technical studies/introduction to employment
3. Technology/economics (introduction to employment)
4. Employment-economics/technology
5. Technology/economics
6. Technology/economics/domestic science
7. Society/politics/introduction to employment
8. Introduction to employment/career guidance (Russell, 1982, p. 12)

In addition to classroom instruction, schools often arrange for students to learn about the world of work and various career options through (a) visits to companies, (b) presentations about skilled occupations by guest speakers from local labor offices, (c) shadowing experiences, and (d) internships in workplaces. German parents play a very important role in helping their youngsters understand the available skilled occupations and make appropriate career decisions. Consequently, career education and guidance in Germany is a comprehensive and well-balanced system.

Specific occupational counseling in Germany is, however, not administered by schools. The Vocational Training Act stipulates that occupational counseling as well as placement into training and occupations can be performed only by the Federal Employment Services. Advising on the choice of a skilled occupation is the exclusive role of this organization. "School teachers are legally denied that role" (Hamilton, 1985, p. 12). The intent is to guarantee that the services remain independent of any political, commercial, and class-related interests (Hanson & Pierce, 1993, p. 48). The Federal Employment Services offers specific guidance to prospective apprentices regarding (a) the

advantages and risks involved in selecting various training options, (b) the post-apprenticeship employment opportunities, (c) the income prospects for various occupations, and (d) the opportunities of advancement and continuing education and training available in various employment sectors. Placement into an apprenticeship is primarily based on a young person's own well-informed choice. While apprentices are selected by employers, approximately 80% of all apprenticeship contracts are arranged through the Federal Employment Services.

In addition to occupational counseling and placement of apprentices, the Federal Employment Services also provides special services in the areas of medical and psychological testing and rehabilitation. Occupational guidance specialists of the Federal Employment Services often test students' personal aptitude and abilities to help them select specific occupations. These services are supported by a tax paid by both employers and employees.

Occupational guidance specialists do most of their counseling and placement work in the local labor offices, which are subordinate agencies of the Federal Employment Services. However, they also visit schools regularly to describe the numerous occupations and training options and provide career guidance. The local labor offices also operate vocational information centers. Open to everyone, these centers have a wide range of media and apprenticeship-related information available, including detailed descriptions of the federally recognized occupations, occupational activities, qualifications, further training opportunities, and trends in the labor market.

Summary of the Literature Review

The traditional American apprenticeship has a long history dating from medieval England. It has evolved into an effective workforce training system but trains only adults in a very limited number of industries and skilled trades. The traditional apprenticeship in the United States is neither part of the vocational-technical education system for young adults nor a common path of transition from school to work.

The recent youth apprenticeship movement attempts to expand apprenticeship to include young adults. Youth apprenticeship is patterned after European vocational training models, especially the dual systems in the German-speaking countries. These models and systems all emphasize the quality training of young people and a smooth school-to-work transition as a national workforce development priority. Countries like Switzerland and Germany attribute their economic success to their well-structured and widely supported dual systems in which on-the-job apprenticeship training joins forces with part-time vocational schooling.

Youth apprenticeship is currently being considered in the United States as a promising alternative in training skilled workers and helping solve many economic and social problems. Many presently operating youth apprenticeship programs endeavor to adhere to the four major principles: (a) combination of employer-provided on-the-job training with school-based instruction, (b) connection between high school and post-secondary education, (c) integration of academic and vocational learning, and (d) conferral of both academic credentials and certification of occupational skill mastery.

The review of the related literature and research revealed a wide variety of opinions and views about apprenticeship in the United States and youth apprenticeship in particular. Many are still leery about the merits of an apprenticeship system for young

adults and the feasibility of involvement of the business community in training youngsters for the workforce. Nevertheless, there is a general agreement that the current American education/training system has not been successful in producing a competent workforce. With the assistance of the Departments of Labor and Education, a number of youth apprenticeship and school-to-work transition projects have been initiated. However, the United States as a whole has not developed and implemented an effective, well-organized apprenticeship system for young adults--a system that trains young people for skilled occupations needed by the labor market and allows for a smooth and successful transition from school to work.

CHAPTER III

METHODS AND PROCEDURES

For the two stated research purposes, there were two corresponding parts in this study. In Part One, a tentative Tennessee model describing the process (steps) and the related practices of an apprenticeship system for young adults was first created. A Delphi method was then utilized to elicit experts' opinions about and comments on the tentative model. Based on the benchmark practices identified by the Delphi panel in three rounds of questionnaires, the tentative model was revised and then finalized. The finalized model was proposed to the Tennessee Council on Vocational Education. In Part Two, descriptive and inferential statistical analyses were conducted to investigate major stakeholders' perceptions about and reactions to the finalized Tennessee Model of Apprenticeship for Young Adults.

Part One

Tentative Tennessee Model of Apprenticeship for Young Adults

In order to develop the tentative Tennessee Model of Apprenticeship for Young Adults, the researcher did an extensive review of the related literature and research (see Chapter Two). A variety of information sources were utilized, including books, professional journal articles, conference proceedings, special reports, and personal communications. The researcher also made visits to some apprenticeship training establishments in the United States and arranged constructive interviews with many

experts in the area of apprenticeship. Among the important topics that were discussed were program management and evaluation, trainee selection, on-the-job training and its articulation with related theoretical instruction, and roles and responsibilities of on-the-job trainers. In addition, the researcher participated in a study tour to Switzerland and Germany. During the tour, he visited a whole range of organizations that are involved in apprenticeship training and had many in-depth discussions with appropriate officials and personnel. The tentative model was the result of all those research endeavors.

After the tentative model was drafted, it was reviewed and critiqued by six faculty members in the Department of Human Resource Development, The University of Tennessee, Knoxville. All these faculty members had extensive knowledge about workforce development, apprenticeship training, and school-to-work transition. As a result of the constructive reviews and critiques, some important modifications were made to the tentative model. To further pilot test the tentative model, it was presented in August 1994 to a special school-to-work transition meeting held by the National Training Institute of the National Joint Apprenticeship Training Committee for the Electrical Industry. The meeting was composed of approximately 100 apprenticeship training directors and electrical contractors. Following the presentation, the written descriptions of the tentative model and a questionnaire were handed out. The participants were asked to read the descriptions and to respond to the questionnaire. About half of the participants completed and returned the questionnaire. Some additional modifications were then made to the tentative model.

The resultant tentative Tennessee Model of Apprenticeship for Young Adults consisted of two parts: (a) the process and (b) the related practices. The following sections are the descriptions of this model.

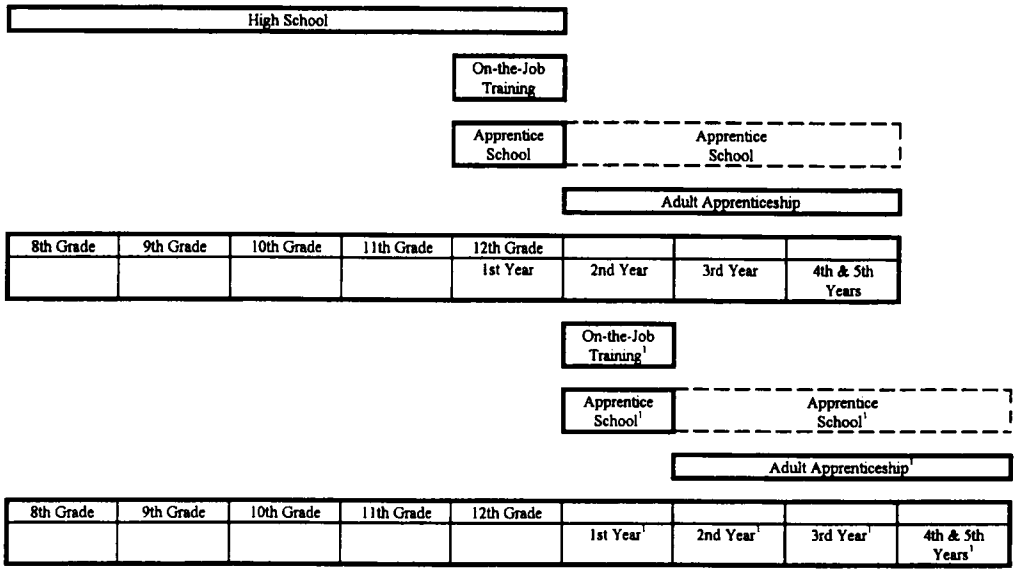
The Process

The Tennessee apprenticeship system for young adults will depend on the cooperative efforts of education, government, union and non-union labor organizations, and, most importantly, employers. It will combine on-the-job training in the workplace with schooling in an apprentice school (see *On-the-Job Training/Apprentice School* in this section). The employer needs to take the lead and offer structured, practical, and employment-relevant work experiences while the apprentice is on the job. The apprentice school will provide both instruction in occupation-related theory and general education coursework. The school curricula will be coordinated with on-the-job training. After the initial year of such training and schooling, apprentices will be indentured into regular adult apprenticeship programs. High school diplomas and/or skilled worker certificates will be issued to those who meet specified requirements.

The entire process of the Tennessee apprenticeship system for young adults is displayed graphically in Figure 1. This process incorporates (a) the transition from secondary school to work, (b) the collaboration between employers and apprentice schools, and (c) the shift from youth apprenticeship to adult apprenticeship. The apprenticeship system for young adults consists of five phases, each of which is comprised of a number of steps.

Phase I (Career Education/Guidance) will start no later than the beginning of the eighth grade. This phase consists of five steps: Orientation to the World of Work (Step 1), Pre-vocational Courses (Step 2), Career Exploration Activities (Step 3), Occupational Counseling (Step 4), and Apprenticeship Path Decision (Step 5).

Phase II (Screening/Selection) will begin at the end of the first term of the 11th grade. It includes the steps of Qualifying Screening (Step 6) and Interview/Selection (Step 7).



Phases	Steps									
I. Career Education/ Guidance	1	Orientation to the World of Work	Orientation to the World of Work							
	2		Pre-vocational Courses	Pre-vocational Courses	Pre-vocational Courses	Pre-vocational Courses[1]				
	3			Career Exploration Activities	Career Exploration Activities	Career Exploration Activities[1]				
	4				Occupa-tional Counseling	Occupa-tional Counseling[1]				
	5				Apprentice-ship Path Decision	Apprentice-ship Path Decision[1]				
II. Screening/ Selection	6				Qualifying Screening	Qualifying Screening[1]				
	7				Interview/ Selection	Interview/ Selection[1]				
III. Initial Indenture	8				Initial Contract Signing	Initial Contract Signing[1]				
IV. Training	9					Initial Probation	Initial Probation[1]			
	10					On-the-Job Training/ Apprentice School	On-the-Job Training/ Apprentice School[1]			
	11					Evaluation	Evaluation[1]			
	12						Adult Apprentice-ship	Adult Apprentice-ship	Adult Apprentice-ship	
	13							Adult Apprentice-ship[1]	Adult Apprentice-ship[1]	Adult Apprentice-ship[1]
V. Credential	14					High School Graduation				
	15						Skilled Worker Certificate	Skilled Worker Certificate	Skilled Worker Certificate	Skilled Worker Certificate[1]

[1] For those who start their apprenticeships after high school graduation.

Figure 1. The Process of the Tennessee Apprenticeship System for Young Adults

Phase III (Initial Indenture), which contains the step of Initial Contract Signing (Step 8), will occur after a youngster is offered an apprenticeship position and before he or she starts the apprenticeship training.

Phase IV (Training) is comprised of five steps: Initial Probation (Step 9), On-the-Job Training/Apprentice School (Step 10), Evaluation (Step 11), and Adult Apprenticeship (Step 12 or Step 13). For most young adults, this phase will start at the end of the 11th grade, usually in July. High school graduates will also be eligible for such apprenticeship training.

Step 12 is the same as Step 13 except that the latter is for those who start their apprenticeships after high school graduation. Depending upon the occupation, the entire length of an apprenticeship program will usually vary between not less than 2 years and not more than 5 years.

Phase V (Credential) is composed of two steps: High School Graduation (Step 14) and Skilled Worker Certificate (Step 15). Step 14 is only for those who start their apprenticeships at the end of the 11th grade.

Orientation to the World of Work (Phase I, Step 1). The secondary (or sometimes primary) school will provide students with an orientation to the world of work no later than the beginning of the eighth grade. It will be an organized program that will help students understand the world of work and begin the process of making a decision about their future. It will also inform them that youth apprenticeship is an alternative to other educational or training programs. Some of the aims of this step are to:

1. Contribute to students' self-awareness
2. Contribute to students' career awareness and their acquaintance with a variety of occupations
3. Impart fundamental insights into essential conditions of modern working life

4. Help students understand the importance of education for future success in skilled occupations

5. Help students understand the importance of occupational skills for achieving career objectives

6. Help students understand the relationship between personal aptitude/interests and occupational characteristics

7. Advise interested students to take courses required to enter apprenticeships and other occupational training programs

The orientation content will be delivered by specially trained school counselors and teachers through classroom teaching, group discussions, audiovisual presentations, and/or computer-mediated instruction. Library research on occupations and careers can also be a practice of this step.

As a result of this orientation experience, each student will tentatively select one or two occupational clusters (groups), such as metalworking, construction, health care, and banking, for pre-vocational training. The student will also lay out a tentative career development plan, with parental review, for the remaining secondary school curriculum. It is extremely important that parents understand and support the apprenticeship alternative and be actively involved in the whole process.

Pre-vocational Courses (Phase I, Step 2). Following or in parallel with Step 1, the secondary school will offer pre-vocational courses through both theoretical instruction and hands-on experiences. The purpose of this effort is to provide students with a foundation of pre-vocational training in occupational clusters (groups) and of positive work behavior. Besides learning the fundamental work-related knowledge and skills and developing a positive attitude toward work, students will become aware of the physiological and psychological requirements of the occupational clusters (groups) that interest them.

Instructional materials will be adopted, adapted, or developed for these courses. Up-to-date curricula, teaching methods, and equipment, such as those used in technology education, will be utilized. All currently available skilled occupations as well as newly recognized apprenticeable occupations will be presented in this broad-based program.

Pre-vocational courses will be taught by pre-vocational teachers in workshops or simulation laboratories. These courses will not be delivered primarily in the form of lectures; they will all emphasize hands-on applications of theoretical subjects. Additional training will be required of the currently employed teachers who are not prepared to teach such courses.

Career Exploration Activities (Phase I, Step 3). In addition to pre-vocational courses, the secondary school will arrange career exploration activities for students who show interest in obtaining occupational preparation through an apprenticeship. This step will be initiated no later than the beginning of the 10th grade, and the activities will facilitate students' exposure to various skilled occupations and workplaces and people working in them. Career exploration activities will provide students with first-hand experiences about the world of work. These experiences will be highly necessary for students to choose a suitable skilled occupation.

The following are examples of some important activities:

1. Presentations by incumbent skilled workers in various occupations
2. Informational sessions about occupational characteristics and employment and training opportunities by representatives from the Tennessee Joint Apprenticeship Training Committee (see *Competent Body* in the section The Related Practices of this chapter)
3. Interviews with business representatives and former apprentices about the nature, characteristics, and conditions of various occupations

4. Occupational skill demonstration fairs where students are able to watch skilled workers doing their jobs and are able to interview them

5. Informational visits or field trips to businesses, such as manufacturing plants, construction sites, hospitals, and banks

6. Brief periods of shadowing work observation experiences in selected occupational settings

Occupational Counseling (Phase I, Step 4). Specific and individually scheduled occupational counseling will be arranged for high school students no later than the beginning of the 11th grade. For those who choose to begin their apprenticeships after high school graduation, such counseling may be arranged at the beginning of the 12th grade.

Specific occupational counseling services will be offered by an organization that is outside of the comprehensive high school and has both the necessary counseling abilities and accurate, up-to-date, and adequate information about the frequently changing characteristics, conditions, and requirements of various skilled occupations. Non-school-based occupational counselors may use personality/aptitude/interest tests to help match student traits with occupational factors.

While they are provided with occupational information, prospective apprentices and their parents will be expected to make informed career choices on their own. Specific occupational counseling will add to the occupational awareness and experience that students have gained from previous career exploration activities.

The occupational counseling organization will be funded and operated by the Tennessee Department of Labor. It will be equipped with all the necessary apprenticeship-related information along with a wide range of presentation media. Young people who are interested in apprenticeship training can refer to the appropriate information prior to,

during, or after counseling sessions. The occupational counseling services will be available free of charge to all eligible individuals.

Since apprenticeships are dependent upon employment opportunities, occupational information must be available to prospective apprentices. While agreements and linkages with local employment security offices would be helpful, local employers will be requested to supply information about their changing demand for skilled workers. Students will not be encouraged to choose apprenticeships which are not likely to provide sufficient employment opportunities, nor will they be encouraged to enter the apprenticeship path if they are only interested in unavailable apprenticeships.

Occupational counseling will provide specific guidance to students regarding:

1. Various recognized skilled occupations and their different skill levels
2. The education and training requirements for entry into various recognized skilled occupations
3. The employment opportunities and risks involved in selecting various apprenticeship options
4. The income and benefit prospects as well as the working conditions for various recognized skilled occupations
5. The promotional requirements and opportunities for various recognized skilled occupations
6. The continuing education and training opportunities available in various employment sectors

Apprenticeship Path Decision (Phase I, Step 5). Following specific occupational counseling, students who are serious about apprenticeship training will be asked to make career decisions and prepare for subsequent qualifying screening. Students will need to commit to the apprenticeship path by submitting an application, co-signed by a parent or

legal guardian, to the high school. Completion of the application will make the student eligible for the following screening step. In the application, a student can indicate interest in more than one recognized skilled occupation and rank his or her occupational choices by preference. The high school will then forward the application to a local Joint Apprenticeship Training Committee (see *Competent Body* in the section The Related Practices of this chapter).

Qualifying Screening (Phase II, Step 6). In this step, interested and qualified students will be selected to become part of a "pool" of prospective apprentices. The screening will be done by a local Joint Apprenticeship Training Committee. Students must be accepted by such a committee as qualified prospective apprentices before they can be placed in the "pool." Being in a "pool" of prospective apprentices, however, will not guarantee being selected into an apprenticeship program. The size of the "pool" will be determined by the Tennessee Joint Apprenticeship Training Committee through local surveys of future employment opportunities.

The following qualifications will be required for the selection of a young adult as part of a "pool" of prospective apprentices:

1. Good record of school attendance and discipline
2. Adequate academic achievement
3. Sufficient performance in pre-vocational and technical courses
4. Satisfactory results on an occupational aptitude test (administered by a local Joint Apprenticeship Training Committee)
5. Demonstrated interest in apprenticeship training (both the student's and his or her parents')
6. Physical condition that meets the requirements of the chosen occupation

Interview/Selection (Phase II, Step 7). Local Joint Apprenticeship Training Committees will begin to select qualified youngsters from the "pool" for interviews with potential employers in the middle of the students' 11th grade. After interviewing the students selected and referred to them by local Joint Apprenticeship Training Committees, employers will make decisions about offering apprenticeships. Interviews with students who want to start their apprenticeships after high school graduation can be arranged in the middle of the students' 12th grade.

Prior to interviews with employers, local Joint Apprenticeship Training Committees will send interviewees the necessary information about the apprenticeship positions and the potential employers. Prospective apprentices can have as many interviews as are available to them before accepting the most suitable apprenticeship offer. Those who are not selected by a local Joint Apprenticeship Training Committee or are not offered an apprenticeship position by any employer may opt for other career alternatives or continue to prepare for the next year's apprenticeship recruitment.

Initial Contract Signing (Phase III, Step 8). Students who are offered and accept apprenticeship positions will sign legally binding initial contracts (indentures) with local Joint Apprenticeship Training Committees. If a student starts an apprenticeship at the end of the 11th grade or is under the age of 18, a parent or a legal guardian must also sign the contract.

The details that an initial contract between a local Joint Apprenticeship Training Committee and an apprentice must specify will include:

1. The type of business where on-the-job training will be conducted
2. The nature, purpose, organization, and objectives of the apprenticeship training

3. The standards and measurements for apprenticeship training in the recognized skilled occupation

4. The requirements for examinations and certifications

5. The starting date and length of the training

6. The whole range of training and instruction to be conducted both on the job and in the apprentice school

7. A schedule of the training/working process in which the apprentice is to receive practical experience on the job

8. The length of the normal training/working day

9. The length of the probationary period

10. The amount of wages and benefits, as well as the progression scale and the manner of payment

11. The rights and duties of the local Joint Apprenticeship Training Committee and the apprentice

12. The provisions governing the initial probation

13. The provisions governing violations of the contract

Initial Probation (Phase IV, Step 9). At the outset of an apprenticeship, there will be a 3- to 6-month probation. Within this initial probationary period, the apprenticeship contract may be terminated by either the local Joint Apprenticeship Training Committee or the apprentice. If an employer wants to discontinue training of an apprentice within the initial probationary period or if an apprentice wants to quit training with an employer while still on probation, the local Joint Apprenticeship Training Committee may either find another apprenticeship position for the apprentice or terminate the contract. If the contract is not terminated within the initial probationary period, it will become binding.

In case of contract termination, the apprentice may be put back into the "pool" and assisted in finding another apprenticeship position if he or she has been in compliance with the conditions specified in the initial contract. Those who start their initial probation at the end of the 11th grade but have had their contracts terminated will go back to their parent high schools to complete high school education. Since equivalent general education courses will be taught in the apprentice school, transferring back to the parent school should not pose a major problem. Employers who have violated apprenticeship contracts will have their apprentices removed. Other apprentices will not be placed with such employers unless they are re-qualified.

On-the-Job Training/Apprentice School (Phase IV, Step 10). On-the-job training of apprentices will normally start at the end of the 11th grade. Apprentices will acquire practical occupational skills and paid work experience under the guidance of qualified trainers (see *Qualifications for In-Company Trainers and Training Companies* in the section The Related Practices of this chapter). In the initial year of the apprenticeship program, on-the-job training can be either 3 or 4 days per week. When necessary, such training will be complemented, but not replaced, by classroom and/or workshop training.

While apprentices are involved in the workplace-based training, they will also attend an apprentice school. Such a school will offer general education courses needed for high school graduation and occupation-related theoretical subjects. The general education courses will be integrated with occupation-related instruction. Classes will be organized according to occupations or occupational fields. In the initial year of apprenticeship training, youngsters who start their apprenticeships at the end of the 11th grade will spend 2 days per week in the apprentice school--one day for instruction in occupation-related technical subjects and the other day for general high school education. High school graduation will be a prerequisite for continuing the subsequent years of

apprenticeship and obtaining a skilled worker certificate. Apprentice schools can also be utilized by subsequent adult apprenticeship programs (see *Adult Apprenticeship* in this section).

For those who start their apprenticeships after high school graduation, there will be a different arrangement. On-the-job training can be 4 or 5 days per week, and apprentices will attend the apprentice school 1 day or 2 evenings per week. The apprentice school curriculum for such apprentices is devoted exclusively to occupation-related theoretical subjects.

Apprentice schools will be centrally located so that apprentices will not have the burden of traveling long distances. These schools will not be part of the comprehensive high school system. They may be housed in technical community colleges, area technical centers (formerly known as area vocational-technical schools), or other sites provided by local Joint Apprenticeship Training Committees, but not in comprehensive high schools.

Every apprentice will be required to keep a daily training journal which records the skills and knowledge that he or she has practiced on the job and been taught in the apprentice school. In the journal, the apprentice will also enter his or her reflections on the learning experiences. The journal will be used as an important means for apprentice evaluation.

Evaluation (Phase IV, Step 11). To ensure completeness of on-the-job training experiences, in-company trainers will review their apprentices' daily training journals and monitor their on-the-job performance and work progress on a regular basis. Apprentice schools will also systematically evaluate apprentices through observation, review of assignments, and testing.

Depending on the occupation, each apprentice will be given at least one comprehensive examination during the initial indenture. This examination will determine

the progress that the apprentice has made in acquiring the necessary skills and knowledge. An apprentice will be allowed to take the comprehensive examination only if he or she has kept a daily training journal which has been judged satisfactory by a board of examiners. In concert with employers and apprentice schools, local Joint Apprenticeship Training Committees will be responsible for establishing boards of examiners and administering such examinations for apprentices.

The comprehensive examination will be based on both practice and theory. The practice part will evaluate how well the apprentice can physically perform the required occupational skills. The theory part will measure the cognitive knowledge that the apprentice has gained from the occupation-related theory instruction in the apprentice school and from the on-the-job training in the workplace. The assessment of theoretical knowledge will typically be in written form and can be supplemented by oral means. The evaluation of physical performance can also be accompanied, but not supplanted, by oral questions and answers. Those who do not pass the comprehensive examination may be reexamined in the failed parts at a later date.

Adult Apprenticeship (Phase IV, Step 12). Starting the 2nd year of apprenticeship training, that is, after an apprentice's high school graduation, the program turns into an adult apprenticeship program. The apprentice will then sign a second contract with his or her adult apprenticeship employer or sponsor. Prior to being indentured into adult apprenticeship programs, all young apprentices must pass the comprehensive examination and meet or exceed all existing or newly established admission requirements for adult apprenticeships.

An adult apprenticeship program can be one that is registered with the Tennessee Joint Apprenticeship Training Committee or one that is registered with the Bureau of Apprenticeship and Training. It can also be a program that has designed articulation with

the initial-year training or a separate program that is devoted to the same skilled occupation. It can be jointly administered by employers and labor unions or operated only by employers. The adult apprenticeship employer or sponsor can be either the apprentice's initial-year employer/sponsor or a different one. All adult apprenticeship programs will also combine on-the-job training with related theoretical instruction. Apprentice schools may still be utilized to teach occupation-related technical subjects for adult apprenticeship programs.

Local Joint Apprentice Training Committees will develop proper linkages and make formal arrangements with the most appropriate and advantageous adult apprenticeship programs. The standards for these programs will satisfy or surpass all the existing national standards for traditional apprenticeships if the latter are available and relevant. The initial year of on-the-job training and occupation-related instruction will count as the 1st year of adult apprenticeship training. Because of the employment projections and the prior agreements with employers and local Joint Apprenticeship Training Committees, all youth apprentices who meet the admission requirements for adult apprenticeships can reasonably expect to be re-indentured. In most cases, apprentices will remain with their initial-year employers.

Adult Apprenticeship (Phase IV, Step 13). This step is identical to Step 12 except that it is for those who will start their apprenticeships after high school graduation.

High School Graduation (Phase V, Step 14). Apprentices who complete high school general education requirements in an apprentice school will be issued regular high school graduation diplomas by their parent high schools at the end of the initial year in the apprentice school.

Skilled Worker Certificate (Phase V, Step 15). Apprentices who have met all the specified training requirements in their adult apprenticeship programs will be issued a

portable skilled (journeyman-level) worker certificate by the Tennessee Department of Labor. Because of the investment by their employers, most apprentices can expect to be employed as skilled workers upon successful completion of their apprenticeships. Because their skilled worker certificates will be widely recognized, those who are not offered subsequent employment by their own employers will still have a much better chance than unskilled workers to secure employment in the same skilled occupations from other employers.

The Related Practices

Recognized Skilled Occupations (Practice 1). The Tennessee Department of Labor will, in coordination with the Bureau of Apprenticeship and Training, be responsible for identifying, determining, revising, and recognizing various apprenticeable skilled occupations in the state of Tennessee. Formally recognized apprenticeable skilled occupations will not be restricted to construction and manufacturing industries; they will include fields in which the traditional apprenticeship system is not involved, such as agriculture, health and human services, banking, communications, office administration, and government and public services. A recognized apprenticeable skilled occupation must be broad enough to allow development of comprehensive knowledge and skills.

Entry to officially recognized skilled occupations will be mainly through formal apprenticeships that combine well-structured on-the-job training with occupation-related in-school instruction. Such a practice will be enforced through legislation that limits employment in recognized skilled occupations without required training.

Apprenticeship Training Standards and Regulations (Practice 2). There will be statewide minimum occupational standards for apprenticeship training. These standards will specify the minimum requirements and competencies for a recognized skilled

occupation. They will also meet or exceed the nationally established standards for traditional apprenticeship programs. Employers will not be prevented from developing skills specific to their own needs, but the minimum standards must be met. The Tennessee Joint Apprenticeship Training Committee will be responsible for identifying, developing, and revising such standards for each recognized skilled occupation. Standards will be used to:

1. Determine whether a business is qualified to train apprentices for recognized skilled occupations
2. Assess apprenticeship programs for young adults
3. Evaluate the achievement of apprentices
4. Develop a recognized, respected, and portable skilled worker credential

In addition to the standards, there will also be a set of statewide regulations governing apprenticeship training for each recognized skilled occupation. The Tennessee Joint Apprenticeship Training Committee will be responsible for developing, revising, and issuing such regulations. Overseeing the implementation of the issued regulations will be a responsibility of local Joint Apprenticeship Training Committees. Apprenticeship training regulations will, at a minimum, specify:

1. The name of a recognized skilled occupation
2. The length of training
3. The minimal skills and knowledge to be acquired by the apprentice
4. The guidelines on training structure and schedule, including a general training plan that guides the timing, sequencing, and organization of the training
5. The duties and responsibilities of local Joint Apprenticeship Training Committees, employers, apprentice schools, and apprentices
6. The standards for apprenticeship training in the recognized skilled occupation

7. The general requirements for examinations

Revisions of the apprenticeship training standards and regulations can be initiated by local Joint Apprenticeship Training Committees, businesses, occupational associations, and labor unions and then evaluated and approved by the Tennessee Joint Apprenticeship Training Committee. These standards and regulations will be coordinated with the curricula in apprentice schools. The standards and regulations approved by the Tennessee Joint Apprenticeship Training Committee will be applicable to all apprenticeship programs for young adults including the subsequent adult apprenticeship programs. Where appropriate, they will also be applied to traditional apprenticeship programs in the state.

Apprentices will receive broad fundamental training basic to the entire field of related skilled occupations, mainly in the initial year, and specialized training for a particular recognized skilled occupation in the following years of their apprenticeships. In order for apprentices to receive such broad and specialized training and not just a narrow range of skills specific to an individual company or a single production or service process, standards for apprenticeship training will be included not just in apprenticeship training regulations but in apprenticeship contracts as well.

Competent Body (Practice 3). A competent body is an organization that has authority over various matters pertaining to apprenticeship training. Such an organization will have participation from businesses, occupational associations, skilled workers, labor unions, apprentice schools, and representatives of the Department of Labor. In the state of Tennessee, this organization can consist of two levels: (a) the Tennessee Joint Apprenticeship Training Committee and (b) local Joint Apprenticeship Training Committees. The Tennessee Joint Apprenticeship Training Committee will be made up of occupation-specific sub-committees--one for each recognized skilled occupation. In each

county and/or designated geographical area, there will also be a local Joint Apprenticeship Training Committee.

The Tennessee Joint Apprenticeship Training Committee will be responsible for:

1. Identifying, determining, and revising the whole range of skills and knowledge required for a specific officially recognized skilled occupation

2. Identifying, developing, and revising the statewide minimum occupational standards for apprenticeship training for each recognized skilled occupation

3. Developing, revising, and issuing the statewide regulations governing apprenticeship training for each recognized skilled occupation

4. Determining the size of the "pool" of prospective apprentices through surveys of employment opportunities for each recognized skilled occupation

5. Defining the terms and conditions of initial apprenticeship contracts

6. Developing, maintaining, and updating the examination requirements for each recognized skilled occupation and setting the rules for administering examinations

7. Determining the minimum wages and benefits for apprenticeships in various recognized skilled occupations

8. Determining the content and scope of the apprentice school curricula devoted to occupation-related technical subjects

9. Defining the required qualifications for apprentice school instructors who teach occupation-related technical subjects

10. Registering the adult apprenticeship programs and contracts that meet the aforementioned minimum standards but are not registered by the Bureau of Apprenticeship and Training

The responsibilities of a local Joint Apprenticeship Training Committee will include:

1. Qualifying screening for prospective apprentices

2. Selecting qualified students for interviews with potential employers

3. Signing initial contracts with apprentices

4. Using the apprenticeship training standards developed by the Tennessee Joint Apprenticeship Training Committee to determine whether businesses and their training personnel have the necessary qualifications to train apprentices for recognized skilled occupations

5. Advising and providing assistance to businesses on apprenticeship training matters

6. Monitoring compliance with the apprenticeship training regulations

7. Ensuring that youth apprentices are not exploited

8. Rotating apprentices among different employers when such a practice is needed

9. Coordinating on-the-job training with occupation-related technical instruction in apprentice schools

10. Establishing boards of examiners and administering apprenticeship comprehensive examinations

11. Instituting and maintaining a register of qualified on-the-job trainers

12. Training trainers in training methods and techniques

13. Recommending issuance of skilled worker certificates to the Tennessee Department of Labor

14. Recommending issuance of qualified trainer certificates to the Tennessee Department of Labor

15. Developing linkages and making arrangements with the most appropriate or qualified adult apprenticeship programs

Rotation of Apprentices (Practice 4). Apprentices will be rotated among different employers by local Joint Apprenticeship Training Committees when businesses which meet the minimum requirements for training apprentices are not able to provide training in the whole range of skills and knowledge required for a given recognized skilled occupation. In remote areas where there are not a sufficient number of firms for rotation, a different arrangement may be approved. On-the-job training may be supplemented by skill training in cooperative training centers which are organized and conducted by local Joint Apprenticeship Training Committees.

Qualifications for In-Company Trainers and Training Companies (Practice 5). Technical and training qualifications will be required of all in-company training personnel who train and supervise apprentices. Such requirements will include:

1. A minimum of 3 years of practical work experience as a certified skilled worker in a recognized skilled occupation
2. Formal training in methods and techniques for training apprentices both on the job and in the classroom
3. Demonstrated interest in training apprentices
4. Sound character

In-company on-the-job trainers will be formally prepared in training methods and techniques through coursework taught by experts designated by a local Joint Apprenticeship Training Committee. Certified skilled workers who are qualified to train apprentices will be issued a qualified trainer certificate by the Tennessee Department of Labor at the recommendation by a local Joint Apprenticeship Training Committee. The maximum certified trainer/apprentice ratio will be one to three.

Besides having qualified trainers, a business that provides apprenticeships will also be required to fulfill additional conditions necessary for quality apprenticeship training. Such conditions include:

1. A safe working environment
2. Adequate facilities, equipment, and tools
3. Specified workstations for training and rotation
4. Production and service work processes necessary to facilitate training in the prescribed skills and knowledge

Only businesses that meet the apprenticeship training standards specified by the Tennessee Joint Apprenticeship Training Committee will be certified by local Joint Apprenticeship Training Committees as qualified apprenticeship training establishments.

Apprenticeship Wages and Benefits (Practice 6). Apprentices will be paid hourly wages and provided with necessary benefits while they are being trained on the job and learning in apprentice schools. The minimum wages and benefits for apprenticeships in various recognized skilled occupations will be determined by the corresponding occupation-specific sub-committees of the Tennessee Joint Apprenticeship Training Committee. Progressive wage scales will be established so that as apprentices acquire more skills and knowledge and become more productive, their wages will be increased. Businesses that train apprentices who are initially indentured with local Joint Apprenticeship Training Committees will have the option to pay apprenticeship wages and benefits through a non-profit organization.

Incentives to Train Young Adults (Practice 7). Incentives will be offered by the state government so that businesses will be motivated to train young adults through apprenticeships. Among many potentially effective incentives is the practice of categorizing all of a business' apprenticeship training costs as tax-deductible expenses. A

"training tax" can also be imposed on companies which do not spend a required percentage of their total payroll on apprenticeship training for young adults. If, however, a company does spend the required percentage or more, then the tax will not be assessed. In addition, a public relations campaign will be initiated so that companies that meet the standards and accept the responsibility for training youth apprentices will be recognized as "exemplary training companies" and honored as making an important contribution to the community.

Financing (Practice 8). Apprenticeship training for young adults will be funded by both businesses and government. Generally speaking, an employer who provides such training will assume all the on-the-job training costs, including the trainers' and apprentices' wages and benefits, instructional materials, and equipment. The state government will assume the expenses of apprentice school education and the operational costs of Joint Apprenticeship Training Committees at both the state and local levels.

Apprentice School Curricula (Practice 9). The occupation-specific sub-committees of the Tennessee Joint Apprenticeship Training Committee will determine the content and scope of the apprentice school curricula devoted to occupation-related technical subjects. When available, national standards will be met or exceeded, and existing curricula will be utilized or adapted. For each recognized skilled occupation, a curriculum committee formed with representatives from the corresponding sub-committee of the Tennessee Joint Apprenticeship Training Committee and relevant apprentice schools will be responsible for developing and revising the occupation-related curricula.

Qualifications for Apprentice School Instructors (Practice 10). The qualifications for an instructor who teaches occupation-related technical subjects in an apprentice school will be decided by the Tennessee Joint Apprenticeship Training Committee. In general, such qualifications will be similar to those required to teach adult apprentices, including

instructor certification requirements and practical work experiences as a skilled worker in a recognized skilled occupation. To update their knowledge about the technological advancements in the occupations they teach, apprentice school instructors should receive continuing training in companies designated by local Joint Apprenticeship Training Committees for a minimum of 1 month every 2 years. Apprentice school teachers who teach general education subjects will satisfy the same qualifications as those for regular high school teachers.

Duties and Responsibilities of Employers (Practice 11). The duties and responsibilities of an employer who provides on-the-job training will include:

1. Meeting the standards for apprenticeship training
2. Following the regulations governing apprenticeship training
3. Imparting the knowledge and skills necessary for achieving the specified on-the-job training objectives
4. Promoting the positive character and work ethic of apprentices

Duties and Responsibilities of Apprentice Schools (Practice 12). The duties and responsibilities of an apprentice school will include:

1. Teaching occupation-related theoretical subjects
2. Providing general high school education for young people who start their apprenticeships at the end of the 11th grade
3. Integrating academic education with occupation-related instruction

Duties and Responsibilities of Apprentices (Practice 13). The main duties and responsibilities of an apprentice will be:

1. Meeting employer expectations
2. Participating in on-the-job training actively
3. Observing all company rules and policies

4. Passing the required examinations and tests
5. Exercising care in the use of tools, machines, and equipment
6. Maintaining a daily training journal
7. Attending the apprentice school and meeting its requirements

Explanation of the Tentative Model

The tentative Tennessee Model of Apprenticeship for Young Adults contains a career education/guidance phase. This phase is patterned after the career education scheme that was originally initiated by then Secretary of Education Sidney Marland (Marland, 1974). A large number of career education programs were funded by the Department of Education during the 1970s. Those programs informed young people about various occupations and helped them choose careers. However, after the funding was removed, many school systems abandoned such programs. The career education/guidance phase of the tentative model is also partly modeled after the Tennessee Career Development Program. This program was widely used in many other states, and it has remained in some Tennessee schools.

In-school career education/guidance programs will most probably be eliminated when federal or state funds are removed. Therefore, the tentative Tennessee Model of Apprenticeship for Young Adults proposes provision of occupational counseling in a center separate from the high school and independent of educational funds. This practice is likely to give occupational counseling a chance to continue and thrive. Although many attempts have been made in the past to improve the role of in-school counselors, they are, however, often overloaded with their daily work, and their major responsibility is almost invariably to serve college-bound students. Giving school counselors duties which they

are not prepared for or interested in adds to their burden and is not a good solution to the present problem. In addition, putting occupational counseling outside of the high school system may impress students with its seriousness and accuracy. Since occupational counseling centers will not be restricted to schools' operating calendars and schedules, students and parents will have easier and more access to the services provided.

The tentative Tennessee Model of Apprenticeship for Young Adults emphasizes that employers will have the primary authority and responsibilities in apprenticeship training for young adults. It is based on the belief that employer-provided on-the-job training is superior to entirely simulated in-school vocational programs. The proposed Tennessee apprenticeship system for young adults is not the same as cooperative education, tech prep, or other school-based vocational training schemes.

Unlike the models adopted in some other states, the tentative Tennessee Model of Apprenticeship for Young Adults does not advocate using practical experience gained in apprenticeship training to obtain regular college credits or degrees. The proposed Tennessee apprenticeship system for young adults is not intended to be an easier access to or avenue through post-secondary academic education. Since the fundamental purpose of an apprenticeship system is not for participants to "go to college" but to prepare qualified workers for skilled occupations, the business community should be in control, and schools should play a collaborative role. Employers' expectations of and requirements for skilled workers must be met. Advancing the principle of offering post-secondary academic credits or degrees to apprentices would easily divert this purpose. It would lessen the influence of employers and allow schools to decide exclusively what youth apprentices need to learn.

This does not mean, however, that youth apprentices should not receive occupation-related post-secondary-level instruction or that post-secondary institutions

should not be involved in apprenticeship training for young adults. Post-secondary institutions' participation in apprenticeship training should be encouraged as long as the primary purpose of their participation is not to exclusively offer academic credits but to provide occupation-related theoretical instruction. Furthermore, the tentative model does not intend to prevent youth apprentices from achieving post-secondary academic qualifications through attending community colleges or other types of post-secondary institutions if they choose to do so during their spare time or after completing their apprenticeships.

The tentative Tennessee Model of Apprenticeship for Young Adults is not an attempt to replace existing secondary and post-secondary vocational education programs or adult apprenticeship programs. It is, however, intended to be an exemplary alternative to other vocational education options and is connected with adult apprenticeship programs.

The tentative Tennessee Model of Apprenticeship for Young Adults does not promote a youth apprenticeship system that will exclusively serve and be coordinated with the apprenticeship programs currently being conducted by labor union organizations and registered with the Bureau of Apprenticeship and Training. The local Joint Apprenticeship Training Committees, whose members will include skilled workers (union and non-union) as well as employers, will develop formal linkages and make befitting arrangements with the most appropriate and advantageous adult apprenticeship programs.

The tentative Tennessee Model of Apprenticeship for Young Adults encourages the utilization of the apprenticeship method of training skilled workers in other occupations that are not currently utilizing it. The Tennessee Department of Labor should be responsible for identifying, revising, and recognizing the apprenticeable skilled occupations in which traditional apprenticeship programs are not involved.

The tentative Tennessee Model of Apprenticeship for Young Adults advocates having apprentices attend apprentice schools rather than their parent high schools. Some of the obvious advantages of this practice are:

1. The occupation-related theoretical instruction offered in the apprentice school may better meet the needs and expectations of business and industry.

2. Apprentices may acquire the behavior of mature adult workers faster and more easily.

3. School schedules and course offerings can be coordinated more easily with employers' schedules. For example, courses may be offered in a variety of formats, including 3- or 4-hour sessions, multiple-week blocks, and so forth.

4. Apprentice schools may be centrally located so that apprentices will not be inconvenienced.

5. Apprentices preparing for the same occupations or occupational fields can be grouped to attend the same required occupation-related technical courses.

Delphi Method

The need for expert opinions about the tentative Tennessee Model of Apprenticeship for Young Adults suggested the use of a Delphi method as an appropriate methodology for this study. A Delphi method is a type of procedure, usually in a questionnaire form, used to gain opinions from and a consensus among experts about a scientifically unapproachable problem. It is more of a structured brainstorming session with subject matter experts than of a "scientific" exercise in prediction (Schwarz, Svedin, & Wittrock, 1982, p. 13). Central to a Delphi study are (a) a series of responses and

feedback steps between the researcher and a panel of experts, (b) anonymity among the individual panel members, and (c) a process for reaching a consensus (Volk, 1993, p.71).

Rasp (1973) described a Delphi method as "a technique for collecting judgments that attempts to overcome the weakness implicit in relying on a single expert, a one shot group average, or a round-table discussion" (pp. 29-30). Such a method is, by definition, concerned with the utilization of opinions of experts, who are rarely available as experimental laboratory subjects (Helmer, 1975, p. xix). Morrison, Renfro, and Boucher (1984) defined a Delphi method as a process in which (a) a group of experts offer their opinions about a certain event anonymously, (b) the results are synthesized by an intermediary, and (c) the summary is fed back to each member of the group with a request to re-estimate their own opinions in light of the synthesized results. This process continues until either the group has reached a consensus close enough for practical purposes or the reasons why such a consensus cannot be achieved have been documented. According to Sackman (1974),

> Delphi is an attempt to elicit expert opinion in a systematic manner for useful results. It usually involves iterative questionnaires administered to individual experts in a manner protecting the anonymity of their responses. Feedback of results accompanies each iteration of the questionnaire, which continues until the convergence of opinion, or a point of diminishing returns, is reached. The end product is the consensus of experts, including their commentary, on each of the questionnaire items, usually organized as a written report by the Delphi investigator. (p. xi)

Because of the numerous distinct procedures employed, a Delphi study is, in reality, not easily definable. It may then best be "characterized as a method for structuring a group communication process so that the process is effective in allowing a group of

individuals, as a whole, to deal with a complex problem" (Linstone & Turoff, 1975, p. 3). Linstone and Turoff (1975) claimed that "when something has attained a point at which it is explicitly definable, then progress has stopped; such is the view we hold with respect to Delphi" (p. 3). Although the definition of a Delphi method is elusive, such main features are commonly considered to be characteristic of a typical Delphi study:

1. There are several rounds of questionnaires in the whole process.
2. Each participant contributes his or her own opinions at each round of questionnaire prior to seeing the input of other participants for that round.
3. Opinions of other participants at all rounds are shared but remain anonymous.
4. Opinions collected at one round of questionnaire are analyzed and edited before they are shared in the next round.
5. Participants' responses to the previous rounds of questionnaires are presented as average values along with some measurements of dispersion.
6. Participants are normally experts in a particular field.
7. The problem under study does not lend itself to experimental studies but can benefit from subjective judgments on a collective basis.

Isaac and Michael (1981) outlined the typical sequence of events in using a Delphi method:

1. Panel members are identified.
2. An initial questionnaire is sent, asking each panel member to provide his or her opinions about certain issues toward which a consensus of opinion is sought.
3. The results are edited into a manageable summary, and a second questionnaire is prepared for item-ranking.
4. Each panel member ranks the items on the second questionnaire.

5. The results of the second questionnaire are presented in the form of a third questionnaire. This third questionnaire shows the preliminary level of group consensus along with each member's earlier responses.

6. Each panel member ranks each item again, and, if desired, provides a brief explanation for any differing opinion.

7. The results are tabulated and presented in a final statement of group consensus.

A Delphi method may, therefore, (a) offer flexibility and freedom of expression for each participant, (b) allow all participants the opportunities to see the opinions and their ratings or rankings by the total group, (c) provide a vehicle for further discussion and input through successive rounds of contact with the participants, and (d) give all individual experts from diverse locations the chance to work on the same problem (Volk, 1993, p. 73). Anonymity among the respondents "represents a deliberate attempt to avoid the disadvantages associated with more conventional uses of experts, such as round-table discussions or other mild forms of confrontation with opposing views" (Dalkey & Helmer, 1963, p. 459).

It is often not the explicit nature of the research problem but the particular circumstances surrounding the necessarily associated group communication process that determine the appropriateness of utilizing a Delphi method. According to Linstone and Turoff (1975), one or more of the following situations would often lead to the need of employing a Delphi method:

1. The problem cannot be studied by experimental procedures but can be approached through collective judgments.

2. The participants needed to contribute to the investigation of the problem have no history of adequate communication among themselves and may represent diverse backgrounds with respect to experience and expertise.

3. Effective, face-to-face interactions are not possible because of a large number of participants needed.

4. Time and cost make frequent group meetings unfeasible.

5. Disagreements among the participants are so severe or politically unpalatable that the communication process must be directed and anonymity must be assured.

6. The heterogeneity of the participants must be preserved, and the "bandwagon effect" must be avoided (p. 4).

The review of the pertinent literature on Delphi studies indicated that many versions and variants of Delphi have been developed since it was first designed and applied at the Rand Corporation in the early 1950s as a method for eliciting expert opinions by means of a structured communication process. Thousands of Delphi studies of varying forms and qualities have been conducted throughout the world since 1964, when the first major report on the application of the technique was published (Gordon & Helmer, 1964). The topics of these studies have also been variant, including the future of absenteeism in the workforce, the prospect for educational technology, the likely incidence of breast cancer, the trend in the design of an "ideal' telephone switchboard, and even the outlook of Delphi itself. Because these studies all have different designs, it is "very difficult to find or recognize good models" (Morrison, Renfro, & Boucher, 1984, p. 49).

While some common principles and characteristics may be found, no conventions have been established for any aspect of a Delphi study, including design, execution, analysis, and reporting. In fact, it is often observed that the procedure designed for one application "does not work for some other application" (Linstone & Turoff, 1975, p. 6).

Variations are, therefore, common and acceptable. For example, the panel for the first round of questionnaire may be different from that for the subsequent rounds (Smith, 1975; Tanney, 1978). The number of rounds also varies, ranging from two to four or more (Isaac & Michael, 1981; Martino, 1973). Studies conducted by Barnes (1987), Haque (1983), Marshall (1984), and Maurizio (1983) illustrated the use of fewer than four rounds of questionnaires. To address a specific problem, a "modified" Delphi method may have to be used (Petty, 1987, pp. 61-67).

Delphi as a research procedure was originally used for forecasting future events. Many Delphi studies have been conducted for this purpose (Cunico, 1974; Isbell, 1980; Starkweather, 1975). While a Delphi method is frequently labeled as a forecasting means to predict future trends and needs, a variety of other types of applications can now be found (Schwarz, Svedin, & Wittrock, 1982, p. 13). These applications include (a) gaining a consensus of opinion with the purpose of establishing priorities in educational planning (Fendt, 1978; Volk, 1993), (b) building the structure of a model (Linstone & Turoff, 1975, p. 4), and (c) exploring the advantages and disadvantages of available policy options (Schwarz, Svedin, & Wittrock, 1982, p. 13). Furthermore, a Delphi study no longer necessarily aims at consensus; it has also been utilized to investigate differences of opinion between different groups of people (Wikström, 1974).

The selection of a panel of experts for a Delphi study is often a subjective but rational process. For instance, for his Delphi study about curriculum guidelines for technology education in developing countries, Volk (1993) used his own appropriate criteria for the selection of the three groups of experts, that is, demonstrated knowledge "through their scholarship, publications, and direct experience in developing countries" (p. 74). The selection of the experts who participated in Petty's (1987) study on the perceived importance of special competencies for deafness rehabilitation specialists was

also based on her own justifiable criteria: (a) status as experts, (b) professional work and interest in the research topic, and (c) representation of researchers, counseling educators, and administrators (p. 62). In order to have a revised strategic planning model for workforce training validated by experts, Mynatt (1992) selected a panel on the basis of three distinct criteria: (a) national reputation in the field, (b) professional work and interest in the research topic, and (c) ongoing activities as a researcher and a practitioner in the field.

The number of Delphi members also varies to a large extent. In Volk's (1993) study, a total of 34 experts were selected to participate on the Delphi panel. Mynatt (1992) and Petty (1987), however, selected only five for their studies. It seems that it is the quality of the expert opinions rather than the number of panel members that is the most important.

Inadequacies of Delphi studies have been identified. For instance, they have often been criticized for not being scientifically rigorous enough (Sackman, 1974). Because of boredom, irritation, and fatigue, panel members' attrition rates are commonly high. More thought-provoking questionnaire designs recurrently result in higher attrition rates among research participants (Morrison, Renfro, & Boucher, 1984, p. 49). Many panel members are frequently biased by the group's overall response; that is, they easily allow themselves to drift toward answers with means or medians. Despite all that, a Delphi method may still be highly advisable when other research methods are not appropriate or practicable for a certain study (Coates, 1975).

Adapted Delphi Method for This Study

Unlike a frequently used Delphi process which starts with a "primary question" and proceeds to collect and analyze various responses to it, the Delphi method specifically adapted for the first part of this study began with eliciting responses by a panel of experts to the tentative Tennessee Model of Apprenticeship for Young Adults. The purpose of this Delphi method was to verify and determine the most important steps and related practices described in the model. During the Delphi study, the subject matter experts who participated on the panel were asked to (a) rate the described steps and practices as well as the entire model, (b) provide suggested changes, and (c) add appropriate steps and practices. Each participant was also requested to rate the changes suggested and steps and practices added by all the panel members. As a whole group, the panel of experts had a decisive impact on the subsequent formation of the finalized Tennessee Model of Apprenticeship for Young Adults.

Panel of Experts

The criteria for the selection of experts for the Delphi panel were determined by the researcher in consultation with two well-known professionals in apprenticeship training and vocational education. These criteria were (a) relevant official positions and titles; (b) expertise and experience in apprenticeship, workforce training, and youth issues; (c) commitment to upholding standards for workforce development, (d) interest in the research topic; and (e) willingness to participate in the study. The researcher then informed these two individuals of the chosen selection criteria and asked them to each recommend eight subject matter experts for the formation of a Delphi panel.

When he got the names, addresses, and phone numbers of those 16 recommended experts, the researcher called them and invited them to participate on the panel. He briefed these experts on the purpose, nature, content, and process of the Delphi study and explained to them what their roles and responsibilities would be. Eleven of the 16 people agreed to participate, and five expressed a lack of interest in the problem to be addressed in the study. Those who agreed to participate were then formally invited.

Questionnaires and Analyses

Three different but interrelated questionnaires were developed by the researcher and administered during the Delphi process. For easy identification and follow up, all copies of the questionnaires sent to the panel members were coded. The first-round questionnaire (see Appendix A) elicited the panel members' opinions about the tentative Tennessee Model of Apprenticeship for Young Adults. Attached to the questionnaire were a copy of the tentative model, a copy of the explanation about the model, and a cover letter (see Appendix B). The panel members were requested to (a) carefully read the tentative model, (b) rate each of the steps and related practices described in the model, (c) rate the entire model, (d) provide suggested changes to the descriptions of the steps and related practices as well as to the entire model, and (e) add steps and practices along with necessary descriptions.

A Likert-type rating scale ranging in the descending order from 6 to 1 was used in the first-round questionnaire. The six point values were defined as 6 = strongly agree , 5 = agree , 4 = partially agree, 3 = partially disagree , 2 = disagree, and 1 = strongly disagree. The experts on the panel were encouraged to suggest necessary changes to all the steps and related practices, especially those that they rated 4, 3, 2, or 1. They were

also assured of anonymity of their responses to the current questionnaire and all the subsequent ones.

An analysis was done of the panel members' responses to the first-round questionnaire (see Chapter IV). Three scores--median, mean, and standard deviation--were calculated from the ratings by the panel members of (a) each of the 15 steps described in the tentative Tennessee Model of Apprenticeship for Young Adults, (b) each of the 13 practices related to the system, and (c) the entire model. Suggested changes to each of the steps and related practices and to the entire model were listed, and similar ones were combined. Added steps and practices were listed and combined in the same manner. Combination of some suggested changes and added steps and practices required confirmation of elusive meanings through further written correspondence and/or telephone interviews with individual members of the Delphi panel.

The second-round questionnaire (see Appendix C) was created on the basis of the analysis of the first-round questionnaire. In this questionnaire, the mean ratings given by all the panel members in the first-round questionnaire were presented. Each member was reminded of his or her own ratings in the previous round of questionnaire. All the changes suggested by the panel members in the first-round questionnaire for each of the steps and related practices and for the entire model, along with the added steps and practices, were also anonymously displayed. The experts on the Delphi panel were asked to (a) compare their own ratings in the first-round questionnaire with the mean ratings by the whole Delphi panel, (b) adjust their own ratings if they wanted, and (c) rate the suggested changes and the added steps and practices on a scale identical to that used in the first-round questionnaire. The second-round questionnaire was also accompanied by a cover letter (see Appendix D).

A second analysis was conducted on the ratings provided by the panel members in the second-round questionnaire (see Chapter IV). Medians, means, and standard deviations were calculated from all the adjusted and unadjusted ratings of the steps and related practices as well as the entire model. The same calculations were also done on the ratings of the suggested changes and the added steps and practices. The steps and practices that had a mean rating of 3.5 or higher in the second-round questionnaire would generally be accepted in a revised Tennessee Model of Apprenticeship for Young Adults. A mean rating below 3.5 would indicate a need for further changes. The suggested changes and the added steps and practices with a mean rating of 3.5 or above would, in general, also be accepted; otherwise, they would be dropped.

The analysis of the responses to the second-round questionnaire resulted in the revised Tennessee Model of Apprenticeship for Young Adults (see Chapter IV). This revised model incorporated most of the steps and related practices as well as the changes and additions that had a group mean rating of 3.5 or above. This analysis was the basis of the formation of the third-round questionnaire (see Appendix E). This last questionnaire, accompanied by a copy of the revised model and a cover letter (see Appendix F), was sent to the panel members for the final verification. In this questionnaire, the experts on the Delphi panel were asked to rate each of the steps and related practices described in the revised model. The rating scale was the same as those used in the previous two rounds of questionnaires.

Development of the Finalized Tennessee Model of Apprenticeship for Young Adults

The analysis of the responses to the third-round questionnaire was also the process of developing the finalized Tennessee Model of Apprenticeship for Young Adults (see Chapter IV). The steps and related practices that had a mean rating of 3.5 or higher in the third-round questionnaire would be accepted in the finalized model. If all the steps and related practices in the revised Tennessee Model of Apprenticeship for Young Adults had such ratings, the revised model would become the finalized model without further modifications.

Procedure

The three questionnaires, along with the three cover letters, were sequentially sent via mail to the members of the Delphi panel, each about every 8 weeks. The first-round questionnaire was accompanied by the tentative Tennessee Model of Apprenticeship for Young Adults as well as the explanation of the model. The revised Tennessee Model of Apprenticeship for Young Adults was attached to the third-round questionnaire. Pre-addressed, postage-paid return envelopes were enclosed in all the questionnaires. In the cover letter for the first-round questionnaire, the researcher expressed his gratitude for the willingness of the panel members to participate in the Delphi study and offered a promise that all the members would be "rewarded" with a copy of the findings of the study. Anonymity of opinions was guaranteed.

Two weeks after each questionnaire was mailed, a postcard was sent to each panel member. These postcards were both thank-you notes for those members who had already

completed and returned the current round of questionnaire and reminders to courteously urge those who had not yet done so. About 4 weeks after each questionnaire was mailed, follow-up telephone calls were made to those from whom no responses had been received, and timely responding to the questionnaire was further requested.

Part Two

Population and Sample

The subjects for the second part of this study were selected from the population of four groups of major stakeholders in the state of Tennessee. As defined in the section Definitions and Explanations of Terms of Chapter I, the four groups of major stakeholders were (a) presidents or chief executive officers in businesses, (b) labor union officials, (c) relevant governmental officials, and (d) directors of vocational education organizations and programs.

The four groups of major stakeholders were the defined subgroups of the population. Fifty subjects were randomly selected for the second part of this study from each of the four groups of major stakeholders. Two published directories--Million Dollar Directory and Directory of Tennessee Manufacturers--were utilized for the selection of subjects from the group Presidents or Chief Executive Officers in Businesses. The subjects for the group Labor Union Officials were selected from a list provided by the Tennessee Department of Labor. The Tennessee Government Officials Directory was used to select labor department officials, county commissioners, and county executives to represent the group Relevant Governmental Officials. A comprehensive mailing list provided by a state vocational education organization was the basis for the selection of

subjects representative of the group Directors of Vocational Education Organizations and Programs. A table of random numbers was utilized for all randomization of sampling.

Data Collection Instrument

A three-item survey questionnaire (see Appendix G) was developed by the researcher to seek major stakeholders' responses to the finalized Tennessee Model of Apprenticeship for Young Adults. This questionnaire was printed on a pre-addressed, postage paid postcard. The three statements, which the participants in the second part of the study were asked to respond to, were about completeness, effectiveness, and implementability of the model. A 7-point Likert-type rating scale was used to determine the respondents' perceptions about and reactions to the model. Ranging in the descending order from 7 to 1, the seven point values represented respectively "strongly agree," "agree," "partially agree," "not sure," "partially disagree," "disagree," and "strongly disagree." For easy identification and follow up, all copies of the instrument were coded.

The survey instrument was not intended to measure a content area or a hypothetical construct; therefore, validity and reliability of the instrument were not relevant issues. However, since the participants in the second part of the study would use the instrument to evaluate the finalized Tennessee Model of Apprenticeship for Young Adults, the length and intelligibility of the model was an important consideration. A three-page, double-columned executive summary of the model was, therefore, created by the researcher (see Appendix H). The summary was read by four English teachers for clarity and readability. They offered detailed feedback on the accessibility of the language of the summary as well as its overall comprehensibility. The feedback was the basis for a final, pre-survey modification of the summary. The Bormuth Grade Level readability index was

used to determine the reading grade level of the modified summary, and the calculated score was 11.6.

Independent and Dependent Variables

The independent variable for the second part of this study was occupation. The four groups of major stakeholders were the defined four levels of the independent variable. Since these groups of major stakeholders were already different in their occupations, the independent variable could not be manipulated.

The dependent variables were these three: (a) perceptions about completeness of the finalized Tennessee Model of Apprenticeship for Young Adults, (b) perceptions about effectiveness of the model, and (c) perceptions about implementability of the model.

Data Collection Procedure

The postcard-type survey questionnaire, along with a copy of the executive summary of the finalized Tennessee Model of Apprenticeship for Young Adults and a cover letter (see Appendix I), was mailed to each selected subject. Since there were 50 selected subjects in each of the four groups, a total of 200 copies of the questionnaire were sent. The cover letter was specifically addressed to each subject and was individually signed by Dr. Clifton Campbell and the researcher. The letter was brief but contained the following information: (a) explanation of the study and its significance, (b) the importance of the respondent's perceptions about the model, (c) a promise of anonymity and confidentiality, (d) a promise of a token reward for participation in the form of a copy of the survey results, and (e) appreciation for the participant's assistance and timely response.

The letter also cordially requested the participant to read the executive summary before he or she responded to the survey questionnaire.

Two weeks after the survey instrument was mailed, a second postcard was mailed to each selected subject (see Appendix J). It was both a thank-you note for those who had already responded and a courteous reminder for those who had not. Two weeks after the postcard was sent, a follow-up letter (see Appendix K), along with a replacement survey questionnaire, an additional copy of the executive summary, and a pre-addressed, postage-paid return envelope, was sent to all the non-respondents. The follow-up letter was short and politely urged those non-respondents to complete and return the survey questionnaire as soon as they could. If the response rate obtained after the three mailings was not high enough, the ratings obtained after the follow-up mailing would then be compared with those obtained before the follow-up mailing. The purpose of this comparison was to determine whether the non-respondents would be similar to the respondents in their ratings of the survey questionnaire. It was assumed that those who responded after the follow-up mailing would be representative of the non-respondents.

Data Analysis Procedures

The descriptive statistical analyses applied on the data obtained from the survey were the median and mean scores and standard deviations of the ratings by each of the four groups of major stakeholders about completeness, effectiveness, and implementability of the finalized Tennessee Model of Apprenticeship for Young Adults. The mean scores were compared to and interpreted along with the median scores.

To assess the validity of the three hypotheses stated in the section Hypotheses of Chapter I, three one-way analyses of variance were performed. These inferential statistical

treatments compared the four groups of major stakeholders in terms of their mean ratings on each of the three dependent variables. In the testing of all three hypotheses, the 0.05 level of significance was utilized. It was assumed that the data obtained from the survey were of the interval type.

Since different groups of major stakeholders might have different response rates, the number of ratings in the four groups of responses might not be the same. If such was the case, the Bartlett's chi-square test would be used on each of the three dependent variables to check the homogeneity of variance assumption. The regular one-way analysis of variance procedure would be used in the situation in which the researcher would fail to reject a null hypothesis using the Bartlett's' test. When the variances of the four groups of ratings were shown to be unequal on any or all of the three dependent variables, the raw data would be transformed with the square-root transformation method.

The Duncan's new multiple range test would be used if a significant F ratio was obtained on any or all of the three dependent variables. The purpose of this procedure was to determine how the four groups of respondents differed on the relevant dependent variables, that is, which of the differences between group means were significant and which were not.

Since the independent variable in the second part of this study could not be manipulated, the nature of the study design was causal-comparative, and the same kinds of control as in an experimental study were not exercised. Therefore, attempts to establish cause-effect relationships were not pursued.

CHAPTER IV

ANALYSIS OF THE DATA AND RESULTS

This chapter is organized in two parts. Part One focuses on analysis of the data collected from the Delphi study about the tentative Tennessee Model of Apprenticeship for Young Adults and about the revised model. Part Two presents the results of the statistical procedures that were utilized to investigate major stakeholders' perceptions about and reactions to the finalized model.

Part One

Final Members of the Delphi Panel

Because the questionnaires used in the Delphi study requested the panel members to provide suggested changes in written form and responding to these questionnaires was thought-provoking and time-consuming, only 7 of the 11 panel members finished all three rounds of questionnaires. None of the four people who resigned from the panel actually started responding to the questionnaires. After reading the first-round questionnaire, they all indicated to the researcher, either in letters or over the phone, that even though they had agreed to participate in the study, their own work schedules and personal arrangements did not allow them to do so.

The final membership of the Delphi panel included leaders of business, labor, education, and government. They were from seven different states in the United States,

and all of them met the specified selection criteria. The following is a listing of the positions and titles held by the Delphi panel members:

1. Director of Apprenticeship Training in a large industrial company in a southeastern state
2. Manager of an employer-operated apprentice school
3. Executive Director of a national joint apprenticeship training committee
4. Director of Apprenticeship Programs of an international association of various manufacturing occupations
5. Director of a school-based youth apprenticeship program
6. Director of Apprenticeship Standards of the department of labor of a northeastern state
7. Director of a regional office of the Bureau of Apprenticeship and Training

Analysis of the Responses to the First-Round Questionnaire

As shown in Table 1, all the steps and related practices of the tentative Tennessee Model of Apprenticeship for Young Adults received a median rating of 4.0 or above in the first-round questionnaire. Five (33%) of the steps and five (38%) of the related practices received a median rating of 4.0; eight (53%) of the steps and eight (62%) of the related practices had a median rating of 5.0; and two (13%) of the steps were given a median rating of 6.0. All the steps and related practices of the tentative model received a mean rating of 3.6 or above, with the highest rating being 5.3. The standard deviations of the group ratings of the steps and related practices ranged from 0.69 to 2.22. The median, mean, and standard deviation of the ratings of the entire model were respectively 4.0, 4.1, and 1.07.

Table 1. Medians, Means, and Standard Deviations of the First-Round Ratings by the Delphi Panel

The Tentative Model	MD	$\overline{X}$	SD
The Process			
Orientation to the World of Work (Phase I, Step 1)	5.0	4.4	1.62
Pre-vocational Courses (Phase I, Step 2)	5.0	4.6	0.98
Career Exploration Activities (Phase I, Step 3)	5.0	5.3	0.76
Occupational Counseling (Phase I, Step 4)	4.0	4.6	0.98
Apprenticeship Path Decision (Phase I, Step 5)	5.0	4.7	1.25
Qualifying Screening (Phase II, Step 6)	5.0	4.9	0.69
Interview/Selection (Phase II, Step 7)	4.0	3.6	2.22
Initial Contract Signing (Phase III, Step 8)	5.0	4.4	1.40
Initial Probation (Phase IV, Step 9)	5.0	5.1	0.69
On-the-Job Training/Apprentice School (Phase IV, Step 10)	4.0	3.9	1.35
Evaluation (Phase IV, Step 11)	4.0	4.3	1.25
Adult Apprenticeship (Phase IV, Step 12)	4.0	4.6	1.40
Adult Apprenticeship (Phase IV, Step 13)	5.0	5.0	1.15
High School Graduation (Phase V, Step 14)	6.0	5.0	1.41
Skilled Worker Certificate (Phase V, Step 15)	6.0	5.1	1.46

Table 1. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
The Related Practices			
Recognized Skilled Occupations (Practice 1)	5.0	4.4	1.51
Apprenticeship Training Standards and Regulations (Practice 2)	4.0	4.0	1.53
Competent Body (Practice 3)	4.0	4.3	1.25
Rotation of Apprentices (Practice 4)	5.0	4.4	1.27
Qualifications for In-Company Trainers and Training Companies (Practice 5)	4.0	3.9	1.35
Apprenticeship Wages and Benefits (Practice 6)	4.0	4.0	1.41
Incentives to Train Young Adults (Practice 7)	5.0	4.9	1.21
Financing (Practice 8)	4.0	4.6	1.13
Apprentice School Curricula (Practice 9)	5.0	4.3	1.60
Qualifications for Apprentice School Instructors (Practice 10)	5.0	4.4	1.13
Duties and Responsibilities of Employers (Practice 11)	5.0	4.7	0.95
Duties and Responsibilities of Apprentice Schools (Practice 12)	5.0	4.7	0.95
Duties and Responsibilities of Apprentices (Practice 13)	5.0	4.7	0.95
The Entire Model	4.0	4.1	1.07

The step of Interview/Selection (Phase II, Step 7) received the lowest median and mean ratings and the highest standard deviation. Although the step of Skilled Worker Certificate (Phase V, Step 15) had the highest median rating and the second highest mean rating, its standard deviation was also relatively high. The step of Career Exploration Activities (Phase I, Step 3) and the step of Initial Probation (Phase IV, Step 9) were the best accepted steps in terms of high median and mean scores and low standard deviation.

The mean of the mean ratings of all the steps and related practices was 4.4; therefore, there was only a small difference of 0.3 between this mean and the group mean rating of 4.1 for the entire model. This indicated that the panel members had, as a group, been consistent when rating the individual steps and related practices of the tentative model and the entire model itself.

A total of 86 changes, including two added practices, were suggested by the panel members (see Table 2). Only the practices of Apprenticeship Training Standards and Regulations (Practice 2), Duties and Responsibilities of Employers (Practice 11), Duties and Responsibilities of Apprentice Schools (Practice 12), and Duties and Responsibilities of Apprentices (Practice 13) did not receive any suggested changes. No steps were added to the process described in the tentative model. However, both discipline and protection of youth apprentices were suggested as added practices for the model.

Among the changes suggested, some were in conflict with each other. For example, for the step of Career Exploration Activities (Phase I, Step III), two opposing views were expressed. According to one view, this step should occur no later than the middle of the ninth grade, but according to the other, it should not begin before the 10th grade. For the practice of Qualifications for In-Company Trainers and Training Companies (Practice 5), one suggested change was that the certified trainer/apprentice ratio should be eliminated because it might be too low in some situations. A contrasting

Table 2. Suggested Changes for the Tentative Tennessee Model of Apprenticeship for Young Adults

The Tentative Model	Suggested Changes
The Process	
Orientation to the World of Work (Phase I, Step 1)	The orientation should start at the end of the ninth grade or later.
	The orientation should be competency-based.
	Students need to be made aware of the issues of physical fitness and substance abuse and their implications for the workplace.
	People from occupations, not school counselors and teachers, should deliver the orientation content.
	Labor representatives should participate in the delivery of the orientation content.
	Occupational clusters (groups) need to be defined in this step.
	Students should be encouraged to review their tentative career development plans with parents and adjust as appropriate.
Pre-vocational Courses (Phase I, Step 2)	Special efforts should be made to relate academic subjects such as mathematics and science to the pre-vocational experiences.
	Pre-vocational teachers can be either regular vocational teachers or academic teachers as long as they have the qualifications to teach these courses.

Table 2. (Continued)

The Tentative Model	Suggested Changes
	The qualifications for pre-vocational teachers need to be specified in this step.
Career Exploration Activities (Phase I, Step 3)	This step should occur earlier, e.g., no later than the middle of the ninth grade.
	This step should not begin before the 10th grade.
	Parents should be actively involved in their children's career exploration activities.
Occupational Counseling (Phase I, Step 4)	This step should be initiated no later than the beginning of the 10th grade.
	Occupational counselors' credentials must include apprenticeship and/or employment experience out of the school environment.
	Occupational counseling should provide comparisons between skilled and professional jobs.
	Occupational counseling should emphasize the importance of mathematics and science courses which relate to the occupational clusters (groups).
Apprenticeship Path Decision (Phase I, Step 5)	This decision should be postponed until after high school graduation.
	Students should be allowed to "try out" one or two work environments before they make the decision.
Qualifying Screening (Phase II, Step 6)	Local Joint Apprenticeship Training Committees, rather than the state-level committee, should be responsible for determining the size of the "pool."

Table 2. (Continued)

The Tentative Model	Suggested Changes
	The qualifications should include prior work, volunteer, and leadership experience.
	The General Aptitude Test Battery administered by the Employment Commission can be used in the screening.
	A standard and consistent procedure should be in place to eliminate nepotism.
	A remedial process should be in place for students who do not qualify.
Interview/Selection (Phase II, Step 7)	Apprenticeship interviews should not be conducted by employers.
	Applicants should be interviewed and selected by local Joint Apprenticeship Training Committees and sent to different companies as apprenticeship positions become available.
	Applicants need a class to learn and develop interviewing skills.
Initial Contract Signing (Phase III, Step 8)	The words "legally binding" should be deleted from the descriptions of this step.
	Initial contracts should also include provisions about holidays, illness, and rights under the National Labor Relations Act.
	All elements in an initial youth apprenticeship contract should be governed by the existing federal regulations regarding apprenticeship training.

Table 2. (Continued)

The Tentative Model	Suggested Changes
	Initial contracts should be registered with a state apprenticeship council/agency or the Bureau of Apprenticeship and Training.
Initial Probation (Phase IV, Step 9)	Justification should be required of either the employer or the apprentice to terminate the contract during the initial probationary period. After the initial probationary period, the apprentice must reimburse the employer and/or the local Joint Apprenticeship Training Committee for the training expenses if he or she quits the program.
On-the-Job Training/Apprentice School (Phase IV, Step 10)	On-the-job training should take no more than 3 days per week. Prior to high school graduation, youth apprentices should spend full weeks alternately on the job and in the apprentice school. If the apprentice quits school during the training period, he or she should be terminated. A free-standing apprentice school should not be established for occupation-related theoretical instruction and general education; integration with community colleges, area technical centers, or even high schools would be a better alternative. Youth apprentices should attend the same evening classes as for adult apprentices for occupation-related instruction.

Table 2. (Continued)

The Tentative Model	Suggested Changes
	A local Joint Apprenticeship Training Committee should have the authority to decide who is responsible for providing occupation-related theoretical instruction.
	Apprentice schools should be housed only in area technical centers, not in community colleges.
	Youth apprentices should not be required to keep a training journal prior to high school graduation.
Evaluation (Phase IV, Step 11)	One comprehensive examination is not enough; testing should be continuous.
	An interim examination should be required during the initial-year apprenticeship training, and a passing grade must be made in both the practice and theory parts to continue the program.
	Comprehensive examinations should be developed by local Joint Apprenticeship Training Committees, but administered by training employers.
Adult Apprenticeship (Phase IV, Step 12)	Passing of a comprehensive examination should not be required as a prerequisite for entering an adult apprenticeship program; a high school graduation diploma or a certificate of initial mastery of academic skills should be adequate.
Adult Apprenticeship (Phase IV, Step 13)	Same as the suggestion for Phase IV, Step 12.

Table 2. (Continued)

The Tentative Model	Suggested Changes
High School Graduation (Phase V, Step 14)	Youth apprentices who receive a high school graduation diploma should have the same level of academic achievement as other comprehensive high school graduates.
Skilled Worker Certificate (Phase V, Step 15)	The skill credential should be called Certificate of Program Completion. The skill credential should be recognized by the Bureau of Apprenticeship and Training.
Steps Added	None
The Related Practices	
Recognized Skilled Occupations (Practice 1)	The suggested legislation is not necessary. Employers' access to the labor market should not be restricted by any enforced formal training requirements.
Apprenticeship Training Standards and Regulations (Practice 2)	None
Competent Body (Practice 3)	In order to avoid conflict with existing trade-specific joint apprenticeship training committees, the name Joint Apprenticeship Training Committee should be changed in this proposed model. The jurisdictional issues between the proposed Tennessee Joint Apprenticeship Training Committee and the Bureau of Apprenticeship and Training need to be addressed.

Table 2. (Continued)

The Tentative Model	Suggested Changes
	It is not necessary for a local Joint Apprenticeship Training Committee to contain occupation-specific committees for all recognized skilled occupations.
	The areas served by local Joint Apprenticeship Training Committees should be structured by defined labor markets rather than counties or other geo-political boundaries.
	The item of "ensuring that youth apprentices are not exploited" is not necessary.
Rotation of Apprentices (Practice 4)	Such a practice should be subject to the desires of the employer and the apprentice.
	Apprentices should not be rotated among different companies and businesses.
Qualifications for In-Company Trainers and Training Companies (Practice 5)	The requirements for qualification should not be restrictive on employers as to how they provide on-the-job training.
	A minimum of 4 years of practical work experience should be required.
	A minimum of 5 years of practical work experience should be required.
	Provisions regarding training in training methods and techniques and the financial support should be addressed in the model.
	Training employers should pay for on-the-job trainers' training in training methods and techniques.

Table 2. (Continued)

The Tentative Model	Suggested Changes
	Training employers and would-be trainers should share the cost of training in training methods and techniques.
	The certified trainer/apprentice ratio should be eliminated from the model.
	The certified trainer/apprentice ratio should be one to one.
	Another impartial body should be responsible for certifying in-company trainers and training companies.
	In-company trainers should be re-certified on a regular basis.
Apprenticeship Wages and Benefits (Practice 6)	Necessary benefits should include health, welfare, and retirement plans transferable from employer to employer.
	Apprentice wages and benefits should be set by employers rather than the Tennessee Joint Apprenticeship Training Committee.
Incentives to Train Young Adults (Practice 7)	No incentives from the state government are necessary; a well-trained workforce is the greatest incentive for employers.
Financing (Practice 8)	The cost of apprenticeship training, including the expenses of apprentice school education, should be covered entirely by employers; no government funding is necessary.

Table 2. (Continued)

The Tentative Model	Suggested Changes
	Youth apprentices also need to invest financially in their training.
Apprentice School Curricula (Practice 9)	Occupation-related curricula should be developed and revised by industry and then approved or disapproved by the Tennessee Joint Apprenticeship Training Committee. Input from apprentice school instructors and apprentices should be reflected in curricula. Existing curricula of established apprenticeship programs should be utilized or adapted.
Qualifications for Apprentice School Instructors (Practice 10)	The qualification requirements for an apprentice school instructor who teaches occupation-related technical subjects should be a bachelor's degree plus 5 years of journeyman-level work experience. A regular high school vocational teaching certificate should not be required to teach occupation-related technical subjects in the apprentice school. Upgrade training should be designated in hours, not in months. The apprentice school instructor who teaches occupation-related technical subjects should be working in the occupation or spend at least 10 weeks every year working in a company.
Duties and Responsibilities of Employers (Practice 11)	None

Table 2. (Continued)

The Tentative Model	Suggested Changes
Duties and Responsibilities of Apprentice Schools (Practice 12)	None
Duties and Responsibilities of Apprentices (Practice 13)	None
Practices Added	Disciplinary practices for youth apprentices should be added to the model. The practice of protecting youth apprentices from being abused should be specified in the model.
The Entire Model	An apprenticeship system for young adults should not be a public-private partnership. Youth apprenticeships should not begin until after high school graduation. High school juniors who have achieved a certificate of initial mastery of basic academic skills should be eligible to start apprenticeship training. Recruitment of youth apprentices should be more frequent than once per year.

suggestion was that the ratio should be only one to one so that training quality can be better ensured. One panel member suggested that the phrase of "ensuring that youth apprentices are not exploited" be deleted from the practice of Competent Body (Practice 3). Another recommended that protection of youth apprentices from being abused be specified as an important practice.

Several suggested changes were at variance with the basic principles for youth apprenticeship. For example, it was suggested by one panel member that youth apprenticeships should not start until after high school graduation. Another example was that the cost of apprenticeship training should be assumed entirely by employers rather than shared by employers, government, and youth apprentices.

No suggested changes were made for the practice of Apprenticeship Training Standards and Regulations (Practice 2) even though two panel members gave it a low rating of 2 and another two gave it a rating of 4. Similarly, while they all received a rating of 3 from one panel member and a rating of 4 from another, the practices of Duties and Responsibilities of Employers (Practice 11), Duties and Responsibilities of Apprentice Schools (Practices 12), and Duties and Responsibilities of Apprentices (Practice 13) were not given any suggested changes.

The majority of the suggested changes were made by individual panel members. There were fifteen changes each of which was suggested by two members. There were four suggestions each of which was made by three members. Six of the seven panel members offered a roughly equal number of suggested changes, and one member suggested a significantly lower number of changes. All the suggested changes, including the added practices, were included in the second-round questionnaire.

Analysis of the Responses to the Second-Round Questionnaire

Table 3 presents the medians, means, and standard deviations of the panel members' second-round ratings of all the steps and related practices of the tentative Tennessee Model of Apprenticeship for Young Adults. Like the median ratings in the first-round questionnaire, all of the second-round median ratings of the steps and related practices were also 4.0 or above. Three (20%) of the steps and four (31%) of the related practices had a median rating of 4.0; 11 (73%) of the steps and nine (69%) of the related practices were given a median rating of 5.0; and one (7%) of the steps received a median rating of 6.0. The second-round mean ratings of all the steps and related practices ranged from 3.7 to 5.3. The lowest standard deviation of the group ratings of the steps and related practices was 0.49, and the highest was 1.46. The median, mean, and standard deviation of the second-round ratings of the entire model were respectively 4.0, 4.4, and 0.98.

While the number of median ratings of 4.0 decreased by 3 in the second-round questionnaire as compared to that in the first-round questionnaire, the number of median scores of 5 increased by 4. The number of median ratings of 6 was 1 less than that in the first-round questionnaire. The second-round median rating of the entire model remained the same as that in the first-round questionnaire, but the mean rating increased by 0.3 and the standard deviation decreased by 0.09. The mean of the second-round mean ratings of all the steps and related practices was 4.6, an increase of 0.2 over that of the first-round scores. The difference between this mean and the second-round group mean rating of 4.4 for the entire model was only 0.2. This again indicated that the panel members' ratings of the individual steps and related practices of the tentative model and their ratings of the entire model were compatible. Twenty-four (86%) of the standard deviations of the group

Table 3. Medians, Means, and Standard Deviations of the Second-Round Ratings by the Delphi Panel

The Tentative Model	MD	$\overline{X}$	SD
The Process			
Orientation to the World of Work (Phase I, Step 1)	5.0	4.6	1.27
Pre-vocational Courses (Phase I, Step 2)	5.0	4.7	0.95
Career Exploration Activities (Phase I, Step 3)	5.0	5.3	0.49
Occupational Counseling (Phase I, Step 4)	5.0	4.7	0.76
Apprenticeship Path Decision (Phase I, Step 5)	5.0	4.9	0.69
Qualifying Screening (Phase II, Step 6)	5.0	4.9	0.69
Interview/Selection (Phase II, Step 7)	4.0	3.7	1.38
Initial Contract Signing (Phase III, Step 8)	5.0	4.6	0.79
Initial Probation (Phase IV, Step 9)	5.0	4.6	0.53
On-the-Job Training/Apprentice School (Phase IV, Step 10)	4.0	4.1	1.46
Evaluation (Phase IV, Step 11)	5.0	4.3	1.38
Adult Apprenticeship (Phase IV, Step 12)	4.0	4.3	1.11
Adult Apprenticeship (Phase IV, Step 13)	5.0	4.6	0.98
High School Graduation (Phase V, Step 14)	6.0	5.1	1.21
Skilled Worker Certificate (Phase V, Step 15)	5.0	5.1	1.07

Table 3. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
The Related Practices			
Recognized Skilled Occupations (Practice 1)	5.0	4.6	1.27
Apprenticeship Training Standards and Regulations (Practice 2)	5.0	4.1	1.21
Competent Body (Practice 3)	4.0	4.4	0.98
Rotation of Apprentices (Practice 4)	5.0	4.4	1.27
Qualifications for In-Company Trainers and Training Companies (Practice 5)	4.0	4.1	1.07
Apprenticeship Wages and Benefits (Practice 6)	4.0	4.1	1.21
Incentives to Train Young Adults (Practice 7)	5.0	4.7	1.11
Financing (Practice 8)	4.0	4.3	0.76
Apprentice School Curricula (Practice 9)	5.0	4.6	0.98
Qualifications for Apprentice School Instructors (Practice 10)	5.0	4.7	0.95
Duties and Responsibilities of Employers (Practice 11)	5.0	4.7	0.95
Duties and Responsibilities of Apprentice Schools (Practice 12)	5.0	5.0	0.58
Duties and Responsibilities of Apprentices (Practice 13)	5.0	4.9	0.69
The Entire Model	4.0	4.4	0.98

ratings of the individual steps and related practices increased as compared with those in the first-round questionnaire. Two (7%) decreased, and another two (7%) remained the same. The "bandwagon" effect was not observed. When responding to the second-round questionnaire, each panel member gave some ratings which were further apart from the corresponding first-round mean ratings than their own first-round ratings.

The step of Interview/Selection (Phase II, Step 7) again received the lowest median and mean ratings. The step of High School Graduation (Phase V, Step 14) was given the highest median and the second highest mean ratings, but it also had a relatively high standard deviation. The step with the highest standard deviation was On-the-Job Training/Apprentice School (Phase IV, Step 10). The step of Career Exploration Activities (Phase I, Step 3) and the practice of Duties and Responsibilities of Apprentice Schools (Practice 12) were best accepted by the Delphi panel in terms of high median and mean ratings and low standard deviation.

Table 4 presents the medians, means, and standard deviations of all 86 changes suggested and practices added in the first-round questionnaire. The mean scores of 3.4 or lower are indicated in italics. Fourteen (16%) of the changes suggested in the first-round questionnaire received the lowest median rating of 2.0, and four (5%) of them received the highest of 6.0. The means and standard deviations of the ratings of the suggested changes ranged respectively from 2.3 to 5.7 and from 0.38 to 2.37.

Forty-two (49%) of the suggested changes received a mean rating below 3.5; therefore, they were generally not included in the revised Tennessee Model of Apprenticeship for Young Adults. Forty-one (98%) of the suggested changes which received a mean rating below 3.5 had a median rating of 3.0 or lower; only one (2%) had a median rating of 4.0. Of all the suggested changes that received a mean rating of 3.5 or higher, only five (11%) had a median rating of 3.0. In the cases of such median-mean

Table 4. Medians, Means, and Standard Deviations of the Suggested Changes

The Tentative Model	MD	$\overline{X}$	SD
The Process			
Orientation to the World of Work (Phase I, Step 1)			
The orientation should start at the end of the ninth grade or later.	3.0	*3.0*	1.83
The orientation should be competency-based.	3.0	*3.1*	1.77
Students need to be made aware of the issues of physical fitness and substance abuse and their implications for the workplace.	5.0	4.9	1.07
People from occupations, not school counselors and teachers, should deliver the orientation content.	3.0	*3.3*	2.06
Labor representatives should participate in the delivery of the orientation content.	4.0	3.7	1.89
Occupational clusters (groups) need to be defined in this step.	3.0	*3.4*	1.27
Students should be encouraged to review their tentative career development plans with parents and adjust as appropriate.	5.0	4.7	0.76
Pre-vocational Courses (Phase I, Step 2)			
Special efforts should be made to relate academic subjects such as mathematics and science to the pre-vocational experiences.	6.0	5.6	0.79
Pre-vocational teachers can be either regular vocational teachers or academic teachers as long as they have the qualifications to teach these courses.	4.0	3.6	1.72

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
The qualifications for pre-vocational teachers need to be specified in this step.	3.0	*3.4*	1.40
Career Exploration Activities (Phase I, Step 3)			
This step should occur earlier, e.g., no later than the middle of the ninth grade.	4.0	3.9	1.96
This step should not begin before the 10th grade.	3.0	*3.1*	1.95
Parents should be actively involved in their children's career exploration activities.	5.0	4.9	0.90
Occupational Counseling (Phase I, Step 4)			
This step should be initiated no later than the beginning of the 10th grade.	4.0	4.3	0.95
Occupational counselors' credentials must include apprenticeship and/or employment experience out of the school environment.	5.0	5.4	0.53
Occupational counseling should provide comparisons between skilled and professional jobs.	3.0	3.6	1.13
Occupational counseling should emphasize the importance of mathematics and science courses which relate to the occupational clusters (groups).	5.0	5.1	0.69
Apprenticeship Path Decision (Phase I, Step 5)			
This decision should be postponed until after high school graduation.	2.0	*2.7*	1.80

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
Students should be allowed to "try out" one or two work environments before they make the decision.	3.0	*3.4*	1.40
Qualifying Screening (Phase II, Step 6)			
Local Joint Apprenticeship Training Committees, rather than the state-level committee, should be responsible for determining the size of the "pool."	5.0	4.6	1.40
The qualifications should include prior work, volunteer, and leadership experience.	2.0	*3.1*	1.68
The General Aptitude Test Battery administered by the Employment Commission can be used in the screening.	3.0	3.7	1.11
A standard and consistent procedure should be in place to eliminate nepotism.	5.0	5.3	0.76
A remedial process should be in place for students who do not qualify.	3.0	*3.4*	1.27
Interview/Selection (Phase II, Step 7)			
Apprenticeship interviews should not be conducted by employers.	2.0	*2.6*	1.90
Applicants should be interviewed and selected by local Joint Apprenticeship Training Committees and sent to different companies as apprenticeship positions become available.	2.0	*3.3*	1.70
Applicants need a class to learn and develop interviewing skills.	4.0	4.3	0.76

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
Initial Contract Signing (Phase III, Step 8)			
The words "legally binding" should be deleted from the descriptions of this step.	5.0	4.6	0.96
Initial contracts should also include provisions about holidays, illness, and rights under the National Labor Relations Act.	5.0	4.4	1.13
All elements in an initial youth apprenticeship contract should be governed by the existing federal regulations regarding apprenticeship training.	2.0	*2.7*	1.80
Initial contracts should be registered with a state apprenticeship council/agency or the Bureau of Apprenticeship and Training.	4.0	4.1	1.07
Initial Probation (Phase IV, Step 9)			
Justification should be required of either the employer or the apprentice to terminate the contract during the initial probationary period.	3.0	*3.0*	1.63
After the initial probationary period, the apprentice must reimburse the employer and/or the local Joint Apprenticeship Training Committee for the training expenses if he or she quits the program.	5.0	4.7	0.76
On-the-Job Training/Apprentice School (Phase IV, Step 10)			
On-the-job training should take no more than 3 days per week.	3.0	*3.4*	1.27

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
Prior to high school graduation, youth apprentices should spend full weeks alternately on the job and in the apprentice school.	3.0	3.6	1.27
If the apprentice quits school during the training period, he or she should be terminated.	6.0	5.6	0.53
A free-standing apprentice school should not be established for occupation-related theoretical instruction and general education; integration with community colleges, area technical centers, or even high schools would be a better alternative.	3.0	*3.4*	1.81
Youth apprentices should attend the same evening classes as for adult apprentices for occupation-related instruction.	3.0	*3.4*	1.81
A local Joint Apprenticeship Training Committee should have the authority to decide who is responsible for providing occupation-related theoretical instruction.	4.0	4.3	1.25
Apprentice schools should be housed only in area technical centers, not in community colleges.	2.0	*2.6*	1.72
Youth apprentices should not be required to keep a training journal prior to high school graduation.	3.0	*2.9*	1.57
Evaluation (Phase IV, Step 11)			
One comprehensive examination is not enough; testing should be continuous.	3.0	*3.3*	1.38

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
An interim examination should be required during the initial-year apprenticeship training, and a passing grade must be made in both the practice and theory parts to continue the program.	3.0	*3.3*	1.38
Comprehensive examinations should be developed by local Joint Apprenticeship Training Committees, but administered by training employers.	4.0	*3.4*	2.37
Adult Apprenticeship (Phase IV, Step 12)			
Passing of a comprehensive examination should not be required as a prerequisite for entering an adult apprenticeship program; a high school graduation diploma or a certificate of initial mastery of academic skills should be adequate.	3.0	*3.1*	1.57
Adult Apprenticeship (Phase IV, Step 13)			
Same as the suggestion for Phase IV, Step 12.	3.0	*3.1*	1.57
High School Graduation (Phase V, Step 14)			
Youth apprentices who receive a high school graduation diploma should have the same level of academic achievement as other comprehensive high school graduates.	6.0	5.7	0.49
Skilled Worker Certificate (Phase V, Step 15)			
The skill credential should be called Certificate of Program Completion.	3.0	*3.0*	1.00
The skill credential should be recognized by the Bureau of Apprenticeship and Training.	3.0	3.7	1.70

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
The Related Practices			
Recognized Skilled Occupations (Practice 1)			
The suggested legislation is not necessary.	5.0	4.7	1.38
Employers' access to the labor market should not be restricted by any enforced formal training requirements.	4.0	4.3	1.38
Apprenticeship Training Standards and Regulations (Practice 2)			
None			
Competent Body (Practice 3)			
In order to avoid conflict with existing trade-specific joint apprenticeship training committees, the name Joint Apprenticeship Training Committee should be changed in this proposed model.	3.0	*3.4*	0.98
The jurisdictional issues between the proposed Tennessee Joint Apprenticeship Training Committee and the Bureau of Apprenticeship and Training need to be addressed.	4.0	4.4	0.98
It is not necessary for a local Joint Apprenticeship Training Committee to contain occupation-specific committees for all recognized skilled occupations.	3.0	3.7	1.11
The areas served by local Joint Apprenticeship Training Committees should be structured by defined labor markets rather than counties or other geo-political boundaries.	5.0	4.6	0.98

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
The item of "ensuring that youth apprentices are not exploited" is not necessary.	3.0	*3.1*	1.07
Rotation of Apprentices (Practice 4)			
Such a practice should be subject to the desires of the employer and the apprentice.	3.0	*2.9*	1.77
Apprentices should not be rotated among different companies and businesses.	3.0	*3.1*	1.57
Qualifications for In-Company Trainers and Training Companies (Practice 5)			
The requirements for qualification should not be restrictive on employers as to how they provide on-the-job training.	4.0	4.3	0.49
A minimum of 4 years of practical work experience should be required.	2.0	*2.9*	1.21
A minimum of 5 years of practical work experience should be required.	2.0	*2.9*	1.21
Provisions regarding training in training methods and techniques and the financial support should be addressed in the model.	4.0	4.7	0.95
Training employers should pay for on-the-job trainers' training in training methods and techniques.	4.0	4.6	0.79
Training employers and would-be trainers should share the cost of training in training methods and techniques.	5.0	5.3	0.76

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
The certified trainer/apprentice ratio should be eliminated from the model.	3.0	*3.4*	1.81
The certified trainer/apprentice ratio should be one to one.	2.0	*2.7*	1.50
Another impartial body should be responsible for certifying in-company trainers and training companies.	2.0	*2.3*	1.50
In-company trainers should be re-certified on a regular basis.	5.0	5.1	0.69
Apprenticeship Wages and Benefits (Practice 6)			
Necessary benefits should include health, welfare, and retirement plans transferable from employer to employer.	2.0	*2.9*	1.21
Apprentice wages and benefits should be set by employers rather than the Tennessee Joint Apprenticeship Training Committee.	4.0	4.4	1.27
Incentives to Train Young Adults (Practice 7)			
No incentives from the state government are necessary; a well-trained workforce is the greatest incentive for employers.	2.0	*3.0*	2.16
Financing (Practice 8)			
The cost of apprenticeship training, including the expenses of apprentice school education, should be covered entirely by employers; no government funding is necessary.	2.0	*2.9*	2.12

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
Youth apprentices also need to invest financially in their training.	6.0	5.4	0.79
Apprentice School Curricula (Practice 9)			
Occupation-related curricula should be developed and revised by industry and then approved or disapproved by the Tennessee Joint Apprenticeship Training Committee.	3.0	*3.1*	1.68
Input from apprentice school instructors and apprentices should be reflected in curricula.	4.0	4.3	0.76
Existing curricula of established apprenticeship programs should be utilized or adapted.	5.0	5.3	0.49
Qualifications for Apprentice School Instructors (Practice 10)			
The qualification requirements for an apprentice school instructor who teaches occupation-related technical subjects should be a bachelor's degree plus 5 years of journeyman-level work experience.	3.0	*2.9*	1.07
A regular high school vocational teaching certificate should not be required to teach occupation-related technical subjects in the apprentice school.	4.0	4.4	1.27
Upgrade training should be designated in hours, not in months.	4.0	4.1	0.38
The apprentice school instructor who teaches occupation-related technical subjects should be working in the occupation or spend at least 10 weeks every year working in a company.	4.0	3.7	0.76

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
Duties and Responsibilities of Employers (Practice 11)			
None			
Duties and Responsibilities of Apprentice Schools (Practice 12)			
None			
Duties and Responsibilities of Apprentices (Practice 13)			
None			
Added Practices			
Disciplinary practices for youth apprentices should be added to the model.	4.0	3.7	1.25
The practice of protecting youth apprentices from being abused should be specified in the model.	4.0	3.9	0.90
The Entire Model			
An apprenticeship system for young adults should not be a public-private partnership.	3.0	*3.0*	1.73
Youth apprenticeships should not begin until after high school graduation.	2.0	*2.7*	1.80
High school juniors who have achieved a certificate of initial mastery of basic academic skills should be eligible to start apprenticeship training.	3.0	*3.0*	2.23

Table 4. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
Recruitment of youth apprentices should be more frequent than once per year.	4.0	4.1	1.07

"differences," extra discretion was given as to whether or not a particular suggested change would be included in the revised Tennessee Model of Apprenticeship for Young Adults. Similar judgment was also made on the suggested changes that received a mean rating of around 3.5 along with a high standard deviation.

Revised Tennessee Model of Apprenticeship for Young Adults

Based on the results of the analyses of the panel members' responses to the first- and second-round questionnaires, the tentative Tennessee Model of Apprenticeship for Young Adults was revised. Slightly more than 50% of the suggested changes were accepted in the revised Tennessee Model of Apprenticeship for Young Adults. The names and sequence of the steps and related practices described in the tentative model were not changed. The added practices were incorporated into the existing framework.

The revised model also consisted of two parts: (a) the process and (b) the related practices. The following sections are the descriptions of this model. All accepted changes are indicated in bold characters except for two deletions of statements (the wording "legally binding" in Phase III, Step 8 and the legislation suggested in Practice 1) and the changes that were "blended" with the descriptions of the tentative model.

The Process

The Tennessee apprenticeship system for young adults depends on the cooperative efforts of employers, labor organizations, education, and government. It combines on-the-job training in the workplace with instruction in an apprentice school (see *On-the-Job Training/Apprentice School* in this section). The employer takes the lead and provides structured, practical, and employment-relevant work experiences while the apprentice is

on the job. The apprentice school offers both instruction in occupation-related theory and general education coursework. The school curricula are coordinated with on-the-job training. After the initial year of such training and schooling, apprentices are indentured into regular adult apprenticeship programs. High school diplomas and/or skilled worker certificates are issued to those who meet the specified requirements.

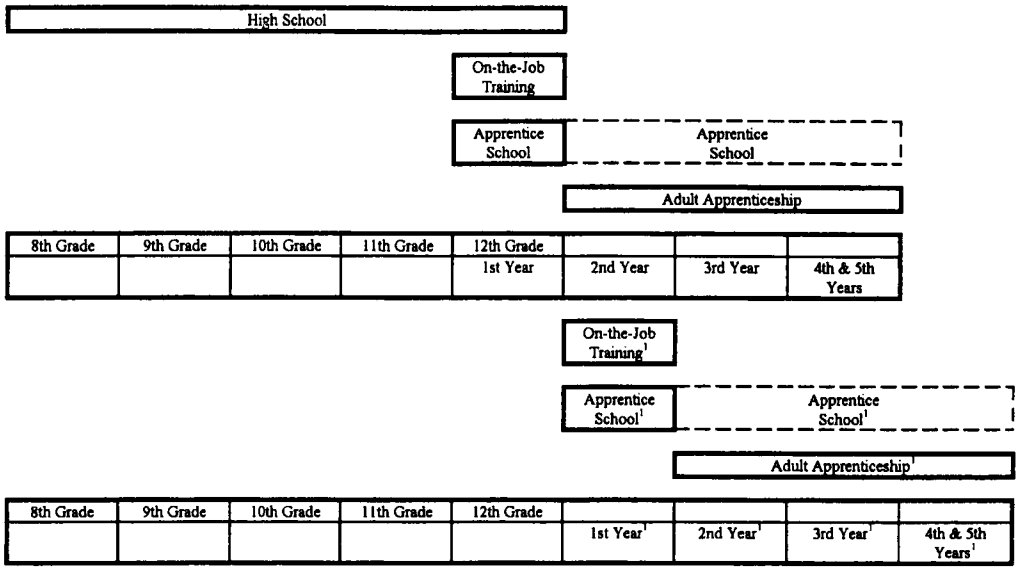
The entire process of the Tennessee apprenticeship system for young adults is displayed graphically in Figure 2. This process incorporates (a) the transition from secondary school to work, (b) the collaboration between employers and apprentice schools, (c) the integration of academic and vocational education, and (d) the shift from youth apprenticeship to adult apprenticeship. The apprenticeship system for young adults consists of five phases, each of which is comprised of a number of steps.

Phase I (Career Education/Guidance) starts no later than the beginning of the eighth grade. This phase consists of five steps: Orientation to the World of Work (Step 1), Pre-vocational Courses (Step 2), Career Exploration Activities (Step 3), Occupational Counseling (Step 4), and Apprenticeship Path Decision (Step 5).

Phase II (Screening/Selection) begins at the end of the first term of the 11th grade. It includes the steps of Qualifying Screening (Step 6) and Interview/Selection (Step 7).

Phase III (Initial Indenture), which contains the step of Initial Contract Signing (Step 8), occurs after young people are offered an apprenticeship position and before they start the apprenticeship training.

Phase IV (Training) is comprised of five steps: Initial Probation (Step 9), On-the-Job Training/Apprentice School (Step 10), Evaluation (Step 11), and Adult Apprenticeship (Step 12 or Step 13). For most young adults, this phase starts at the end of the 11th grade, usually in July. High school graduates are also eligible for such apprenticeship training.



Phases	Steps									
I. Career Education/ Guidance	1	Orientation to the World of Work	Orientation to the World of Work							
	2		Pre-vocational Courses	Pre-vocational Courses	Pre-vocational Courses	Pre-vocational Courses[1]				
	3		**Career Exploration Activities**	Career Exploration Activities	Career Exploration Activities	Career Exploration Activities[1]				
	4			**Occupa-tional Counseling**	Occupa-tional Counseling	Occupa-tional Counseling[1]				
	5				Apprentice-ship Path Decision	Apprentice-ship Path Decision[1]				
II. Screening/ Selection	6				Qualifying Screening	Qualifying Screening[1]				
	7				Interview/ Selection	Interview/ Selection[1]				
III. Initial Indenture	8				Initial Contract Signing	Initial Contract Signing[1]				
IV. Training	9					Initial Probation	Initial Probation[1]			
	10					On-the-Job Training/ Apprentice School	On-the-Job Training/ Apprentice School[1]			
	11					Evaluation	Evaluation[1]			
	12						Adult Apprentice-ship	Adult Apprentice-ship	Adult Apprentice-ship	
	13							Adult Apprentice-ship[1]	Adult Apprentice-ship[1]	Adult Apprentice-ship[1]
V. Credential	14					High School Graduation				
	15						Skilled Worker Certificate	Skilled Worker Certificate	Skilled Worker Certificate	Skilled Worker Certificate[1]

[1] For those who start their apprenticeships after high school graduation.

Figure 2. The Process of the Tennessee Apprenticeship System for Young Adults

Step 12 is the same as Step 13 except that the latter is for those who start their apprenticeships after high school graduation. Depending upon the occupation, the entire length of an apprenticeship program usually varies between not less than 2 years and not more than 5 years.

Phase V (Credential) is composed of two steps: High School Graduation (Step 14) and Skilled Worker Certificate (Step 15). Step 14 is only for those who start their apprenticeships at the end of the 11th grade.

Orientation to the World of Work (Phase I, Step 1). The secondary (or sometimes primary) school provides students with an orientation to the world of work no later than the beginning of the eighth grade. It is an organized program that helps students understand the world of work and begin the process of making a decision about their future. It also informs them that youth apprenticeship is an alternative to other educational or training programs. Some of the aims of this step are to:

1. Contribute to students' self-awareness
2. Contribute to students' career awareness and their acquaintance with a variety of occupations
3. Impart fundamental insights into essential conditions of modern working life
4. Help students understand the importance of education for future success in skilled occupations
5. Help students understand the importance of occupational skills for achieving career objectives
6. Help students understand the relationship between personal aptitude/interests and occupational characteristics
7. Advise interested students to take courses required to enter apprenticeships and other occupational training programs

8. **Help students become aware of the issues of physical fitness and substance abuse as well as their implications for the workplace**

The orientation content is delivered by specially trained school counselors and teachers through classroom teaching, group discussions, audiovisual presentations, and/or computer-mediated instruction. **Whenever feasible, skilled workers and representatives from labor organizations are invited to participate in the delivery of the orientation content**. Library research on occupations and careers can also be a practice in this step.

As a result of this orientation experience, each student tentatively selects one or two occupational clusters (groups), such as metalworking, construction, and health care, for pre-vocational training. The student also lays out a tentative career development plan, with parental agreement, for the remaining secondary school curriculum. **Students are encouraged to review their tentative career development plans with parents and adjust as appropriate**. It is extremely important that parents understand and support the apprenticeship alternative and be actively involved in the whole process.

Pre-vocational Courses (Phase I, Step 2). Following or in parallel with Step 1, the secondary school offers pre-vocational courses through both theoretical instruction and hands-on experiences. The purpose of this effort is to provide students with a foundation of pre-vocational training in occupational clusters (groups) and of positive work behavior. Besides learning the fundamental work-related knowledge and skills and developing a positive attitude toward work, students become aware of the physiological and psychological requirements of the occupational clusters (groups) that interest them.

Instructional materials are adopted, adapted, or developed for these courses. Whenever appropriate, up-to-date curricula, teaching methods, and equipment, such as those used in technology education, are utilized. All currently available skilled

occupations as well as newly recognized apprenticeable occupations are presented in this broad-based program.

Pre-vocational courses are taught by pre-vocational teachers in workshops or simulation laboratories. These courses are not delivered primarily in the form of lectures; they all emphasize hands-on applications of theoretical subjects. **Special efforts are made to integrate academic subjects such as mathematics and science with pre-vocational courses**. Additional training is required of the currently employed teachers who are not prepared to teach such courses. **Teachers of pre-vocational courses can be either regular vocational or academic teachers as long as they have acquired the necessary qualifications to teach these courses**.

Career Exploration Activities (Phase I, Step 3). In addition to pre-vocational courses, the secondary school arranges career exploration activities for students who show interest in obtaining occupational preparation through an apprenticeship. **This step is initiated no later than the middle of the ninth grade**. Career exploration activities facilitate students' exposure to various skilled occupations and workplaces and people working in them. They also provide students with first-hand experiences about the world of work. These experiences are highly necessary for students to choose a suitable skilled occupation. **Parents are encouraged to actively participate in their children's career exploration activities**.

The following are examples of some important activities:

1. Presentations by incumbent skilled workers in various occupations
2. Informational sessions about occupational characteristics and employment and training opportunities by representatives from the Tennessee Joint Apprenticeship Training Committee (see *Competent Body* in the section The Related Practices of this chapter)

3. Interviews with business representatives and former apprentices about the nature, characteristics, and conditions of various occupations

4. Occupational skill demonstration fairs where students are able to watch skilled workers doing their jobs and are able to interview them

5. Informational visits or field trips to businesses, such as manufacturing plants, construction sites, hospitals, and banks

6. Brief periods of shadowing work observation experiences in selected occupational settings

Occupational Counseling (Phase I, Step 4). **Specific and individually scheduled occupational counseling is arranged for secondary school students no later than the beginning of the 10th grade**. For those who choose to begin their apprenticeships after high school graduation, such counseling may be arranged at the beginning of the 12th grade.

Specific occupational counseling services are offered by an organization that is outside of the comprehensive high school system and has both the necessary counseling abilities and accurate, up-to-date, and adequate information about the frequently changing characteristics, conditions, and requirements of various skilled occupations. **Non-school-based occupational counselors must have apprenticeship and/or employment experience outside of the school environment**. They may use personality, aptitude, or interest tests to help match student traits with occupational factors. **Occupational counseling emphasizes the importance of taking mathematics and science courses related to the occupational clusters (groups)**.

While they are provided with occupational information, prospective apprentices and their parents are expected to make informed career choices on their own. Specific

occupational counseling adds to the occupational awareness and experience that students have gained from previous career exploration activities.

The occupational counseling organization is funded and operated by the Tennessee Department of Labor. It is equipped with all the necessary apprenticeship-related information along with a wide range of presentation media. Young people, as well as their parents, who are interested in apprenticeship training can refer to the appropriate information prior to, during, or after counseling sessions. The occupational counseling services are available free of charge to all eligible individuals.

Since apprenticeships are dependent upon employment opportunities, occupational information must be available to prospective apprentices. While agreements and linkages with local employment security offices would be helpful, local employers are requested to supply information about their changing demand for skilled workers. Students are not encouraged to choose apprenticeships which are not likely to provide sufficient employment opportunities, nor are they encouraged to enter the apprenticeship path if they are interested only in unavailable apprenticeships.

Occupational counseling provides specific guidance to students regarding:

1. **Similarities and differences between skilled occupations and "professional" jobs as well as their different career paths**
2. Various recognized skilled occupations and their different skill levels
3. The education and training requirements for entry into various recognized skilled occupations
4. The employment opportunities and risks involved in selecting various apprenticeship options
5. The income and benefit prospects as well as the working conditions for various recognized skilled occupations

6. The promotional requirements and opportunities for various recognized skilled occupations

7. The continuing education and training opportunities available in various employment sectors

Apprenticeship Path Decision (Phase I, Step 5). Following specific occupational counseling, students who are serious about apprenticeship training are asked to make career decisions and prepare for subsequent qualifying screening. Students commit to the apprenticeship path by submitting an application to the high school. The application must be co-signed by a parent or legal guardian. A completed application makes the student eligible for the next step of qualifying screening. In the application, a student can indicate interest in more than one recognized skilled occupation and rank his or her occupational choices by preference. The high school then forwards the application to a local Joint Apprenticeship Training Committee (see *Competent Body* in the section The Related Practices of this chapter).

Qualifying Screening (Phase II, Step 6). In this step, interested and qualified students are selected to become part of a "pool" of prospective apprentices. The screening is done by a local Joint Apprenticeship Training Committee. Students must be accepted by such a committee as qualified prospective apprentices before they can be placed in the "pool." Being in a "pool" of prospective apprentices, however, does not guarantee being selected into an apprenticeship program. **The size of a "pool" is determined by the local Joint Apprenticeship Training Committee on the basis of surveys of future employment opportunities. A standard and consistent procedure is in place to prevent nepotism.**

The following qualifications are required for the selection of a young adult as part of a "pool" of prospective apprentices:

1. Good record of school attendance and discipline
2. Adequate academic achievement
3. Sufficient performance in pre-vocational and technical courses
4. Satisfactory results on an occupational aptitude test (administered by a local Joint Apprenticeship Training Committee)
5. Demonstrated interest in apprenticeship training (both the student's and his or her parents')
6. Physical condition that meets the requirements of the chosen occupation

Interview/Selection (Phase II, Step 7). Local Joint Apprenticeship Training Committees begin to select qualified young people from the "pool" for interviews with potential employers in the middle of the students' 11th grade. After interviewing the students selected and referred to them by local Joint Apprenticeship Training Committees, employers make decisions about offering apprenticeships. Interviews with students who want to start their apprenticeships after high school graduation can be arranged in the middle of the students' 12th grade.

Prior to interviews with employers, prospective apprentices need to learn and develop interviewing skills. Local Joint Apprenticeship Training Committees send interviewees the necessary information about the apprenticeship positions and the potential employers. Prospective apprentices can have as many interviews as are available to them before accepting the most suitable apprenticeship offer. Those who are not selected by a local Joint Apprenticeship Training Committee or are not offered an apprenticeship position by any employer may opt for other career alternatives or continue to prepare for the next year's apprenticeship recruitment.

Initial Contract Signing (Phase III, Step 8). Students who are offered and accept apprenticeship positions are required to sign initial contracts (indentures) with local Joint

Apprenticeship Training Committees. **Whenever feasible, initial contracts are registered with a state apprenticeship council/agency or the Bureau of Apprenticeship and Training**. If a student starts an apprenticeship at the end of the 11th grade or is under the age of 18, a parent or a legal guardian must also sign the contract.

The details that an initial contract between a local Joint Apprenticeship Training Committee and an apprentice must specify include:

1. The type of business where on-the-job training will be conducted
2. The nature, purpose, organization, and objectives of the apprenticeship training
3. The standards and measurements for apprenticeship training in the recognized skilled occupation
4. The requirements for examinations and certifications
5. The starting date and length of the training
6. The whole range of training and instruction to be conducted both on the job and in the apprentice school
7. A schedule of the training/working process in which the apprentice is to receive practical experience on the job
8. The length of the normal training/working day
9. The length of the probationary period
10. The amount of wages and benefits, as well as the progression scale and the manner of payment
11. **The provisions for holidays and sick leaves**
12. The rights and duties of the local Joint Apprenticeship Training Committee and the apprentice

13. The provisions governing the initial probation

14. The provisions governing violations of the contract

Initial Probation (Phase IV, Step 9). At the outset of an apprenticeship, there is a 3- to 6-month probation. Within this initial probationary period, the apprenticeship contract may be terminated by either the local Joint Apprenticeship Training Committee or the apprentice. If an employer wants to discontinue training of an apprentice within the initial probationary period or if an apprentice wants to quit training with an employer while still on probation, the local Joint Apprenticeship Training Committee may either find another apprenticeship position for the apprentice or terminate the contract. If the contract is not terminated within the initial probationary period, it becomes binding. **After the initial probationary period, an apprentice may be required to reimburse the employer and/or the local Joint Apprenticeship Training Committee for the training expenses if he or she quits the program**.

In case of contract termination, the apprentice may be put back into the "pool" and assisted in finding another apprenticeship position if he or she has been in compliance with the conditions specified in the initial contract. Those who start their initial probation at the end of the 11th grade but have had their contracts terminated need to go back to their parent high schools to complete high school education. Since equivalent general education courses are taught in the apprentice school, transferring back to the parent school should not pose a major problem.

Employers who have violated apprenticeship contracts have their apprentices removed. Other apprentices are not placed with such employers unless they are re-qualified.

On-the-Job Training/Apprentice School (Phase IV, Step 10). On-the-job training of apprentices normally starts at the end of the 11th grade. Apprentices acquire practical

occupational skills and paid work experience under the guidance of qualified trainers (see *Qualifications for In-Company Trainers and Training Companies* in the section The Related Practices of this chapter). In the initial year of the apprenticeship program, on-the-job training can be either 3 or 4 days per week. When necessary, such training is complemented, but not replaced, by classroom and/or workshop training.

While apprentices are involved in the workplace-based training, they also attend an apprentice school. Such a school offers occupation-related theoretical subjects as well as general education courses needed for high school graduation. The general academic education subjects are integrated with occupation-related instructional courses. Classes are organized according to occupations or occupational fields. In the 1st year of apprenticeship training, young people who start their apprenticeships at the end of the 11th grade spend 2 days per week in the apprentice school--one day for instruction in occupation-related technical subjects and the other day for general high school education. **When necessary, apprentices may spend multiple-week blocks alternately on the job and in the apprentice school**.

High school graduation is a prerequisite for continuing the subsequent years of adult apprenticeship (see *Adult Apprenticeship* in this section) and obtaining a skilled worker certificate. **If an apprentice quits school during the apprenticeship training period, he or she is terminated**. Apprentice schools can also be utilized by subsequent adult apprenticeship programs.

For those who start their apprenticeships after high school graduation, there is a different arrangement. On-the-job training can be 4 or 5 days per week, and apprentices can attend the apprentice school 1 day or 2 evenings per week. Block schedules can also be used. The apprentice school curriculum for such apprentices is devoted exclusively to occupation-related theoretical subjects. **Apprentices may choose to attend evening**

programs provided for regular adult apprentices. Local Joint Apprenticeship Training Committees have the authority to decide what evening programs are qualified to provide required occupation-related theoretical instruction for youth apprentices.

Apprentice schools are centrally located so that apprentices do not have the burden of traveling long distances. These schools are not part of the comprehensive high school system. They may be housed in technical community colleges, area technical centers (formerly known as area vocational-technical schools), or other sites provided by local Joint Apprenticeship Training Committees, but not in comprehensive high schools.

Every apprentice is required to keep a daily training journal which records the skills and knowledge that he or she has practiced on the job and been taught in the apprentice school. In the journal, the apprentice also needs to enter his or her reflections on the learning experiences. The journal is used as an important means for apprentice evaluation.

Evaluation (Phase IV, Step 11). To ensure completeness of on-the-job training experiences, in-company trainers review their apprentices' daily training journals and monitor their on-the-job performance and work progress on a regular basis. Apprentice schools also systematically evaluate apprentices through observation, review of assignments, and testing.

Depending on the occupation, each apprentice is given at least one comprehensive examination during the initial indenture. This examination determines the progress that the apprentice has made in acquiring the necessary skills and knowledge. An apprentice is allowed to take the comprehensive examination only if he or she has kept a daily training journal which has been determined satisfactory by a board of examiners. In concert with employers and apprentice schools, local Joint Apprenticeship Training Committees are

responsible for establishing boards of examiners and administering such examinations for apprentices.

The comprehensive examination is based on both practice and theory. The practice part evaluates how well the apprentice can physically perform the required occupational skills. The theory part measures the cognitive knowledge that the apprentice has gained from the occupation-related theory instruction in the apprentice school and from the on-the-job training in the workplace. The assessment of theoretical knowledge is typically in written form and can be supplemented by oral means. The evaluation of physical performance can also be accompanied, but not supplanted, by oral questions and answers. Those who do not pass the comprehensive examination may be reexamined in the failed parts at a later date.

Adult Apprenticeship (Phase IV, Step 12). Starting the 2nd year of apprenticeship training, that is, after an apprentice's high school graduation, the program turns into an adult apprenticeship program. The apprentice then signs a second contract with his or her adult apprenticeship employer or sponsor. Prior to being indentured into adult apprenticeship programs, all young apprentices must pass the comprehensive examination and meet or exceed all existing or newly established admission requirements for adult apprenticeships.

An adult apprenticeship program can be one that is registered with the Tennessee Joint Apprenticeship Training Committee or one that is registered with the Bureau of Apprenticeship and Training. It can also be a program that has designed articulation with the initial-year training or a separate program that is devoted to the same skilled occupation. It can be jointly administered by employers and labor unions or operated exclusively by employers. The adult apprenticeship employer or sponsor can be either the apprentice's initial-year employer/sponsor or a different one. All adult apprenticeship

programs also combine on-the-job training with related theoretical instruction. Apprentice schools may still be utilized to teach occupation-related technical subjects for adult apprenticeship programs.

Local Joint Apprentice Training Committees develop proper linkages and make formal arrangements with the most appropriate and advantageous adult apprenticeship programs. The standards for these programs must meet or surpass all the existing national standards for traditional apprenticeships if the latter are available and relevant. The initial year of on-the-job training and occupation-related instruction counts as the 1st year of adult apprenticeship training. Because of the employment projections and the prior agreements with employers and local Joint Apprenticeship Training Committees, all youth apprentices who have passed the comprehensive examination and the initial probation, have obtained a high school graduation diploma, and meet the admission requirements for adult apprenticeships can reasonably expect to be re-indentured. It is likely that most apprentices will remain with their initial-year employers.

Adult Apprenticeship (Phase IV, Step 13). This step is identical to Step 12 except that it is for those who start their apprenticeships after high school graduation.

High School Graduation (Phase V, Step 14). Apprentices who complete high school general education requirements in an apprentice school are issued a regular high school graduation diploma by their parent high schools at the end of the initial year in the apprentice school. **Youth apprentices who receive a high school graduation diploma are expected to have the same level of academic achievement as other comprehensive high school graduates**.

Skilled Worker Certificate (Phase V, Step 15). Apprentices who meet all the specified training requirements in their adult apprenticeship programs are issued a portable skilled (journeyman-level) worker certificate by the Tennessee Department of Labor.

Whenever possible, this skill credential is also recognized by the Bureau of Apprenticeship and Training. Because of the investment by their employers, most apprentices can expect to be employed as skilled workers upon successful completion of their apprenticeships. Because their skilled worker certificates are widely recognized, those who are not offered subsequent employment by their own employers still have a much better chance than unskilled workers to secure employment in the same skilled occupations from other employers.

The Related Practices

Recognized Skilled Occupations (Practice 1). In coordination with the Bureau of Apprenticeship and Training, the Tennessee Department of Labor is responsible for identifying, determining, revising, and recognizing various apprenticeable skilled occupations in the state. Formally recognized apprenticeable skilled occupations are not restricted to construction and manufacturing industries; they include fields in which the traditional apprenticeship system is not involved, such as agriculture, health and human services, banking, communications, sales, office administration, and government and public services. A recognized apprenticeable skilled occupation must be broad enough to allow development of comprehensive knowledge and skills. Entry to such officially recognized skilled occupations should be mainly through formal apprenticeships that combine well-structured on-the-job training with occupation-related in-school instruction.

Apprenticeship Training Standards and Regulations (Practice 2). Statewide minimum occupational standards for apprenticeship training must be established. These standards should specify the minimum requirements and competencies for a recognized skilled occupation. They should also meet or exceed the nationally established standards

for traditional apprenticeship programs. Employers are not prevented from developing skills specific to their own needs, but the minimum standards must be met.

The Tennessee Joint Apprenticeship Training Committee is responsible for identifying, developing, and revising such standards for each recognized skilled occupation. Standards are used to:

1. Determine whether a business is qualified to train apprentices for recognized skilled occupations
2. Assess apprenticeship programs for young adults
3. Evaluate the achievement of apprentices
4. Develop a recognized, respected, and portable skilled worker credential

In addition to the standards, there should also be a set of statewide regulations governing apprenticeship training for each recognized skilled occupation. The Tennessee Joint Apprenticeship Training Committee is responsible for developing, revising, and issuing such regulations. Overseeing the implementation of the issued regulations is a responsibility of local Joint Apprenticeship Training Committees. The apprenticeship training regulations specify minimally:

1. The name of a recognized skilled occupation
2. The length of training
3. The minimal skills and knowledge to be acquired by the apprentice
4. The guidelines on training structure and schedule, including a general training plan that guides the timing, sequencing, and organization of the training
5. The duties and responsibilities of local Joint Apprenticeship Training Committees, employers, apprentice schools, and apprentices
6. The standards for apprenticeship training in the recognized skilled occupation
7. The general requirements for examinations

Revisions of the apprenticeship training standards and regulations can be initiated by local Joint Apprenticeship Training Committees, businesses, occupational associations, and labor unions and then evaluated and approved by the Tennessee Joint Apprenticeship Training Committee. These standards and regulations are coordinated with the curricula in apprentice schools. The standards and regulations approved by the Tennessee Joint Apprenticeship Training Committee are applicable to all apprenticeship programs for young adults including the subsequent adult apprenticeship programs. Where appropriate, they are also applied to traditional apprenticeship programs in the state.

Apprentices receive broad fundamental training basic to the entire field of related skilled occupations, mainly in the initial year, and specialized training for a particular recognized skilled occupation in the following years of their apprenticeships. In order for apprentices to receive such broad and specialized training and not just a narrow range of skills specific to an individual company or a single production or service process, standards for apprenticeship training are included not just in apprenticeship training regulations but in apprenticeship contracts as well.

Competent Body (Practice 3). A competent body is an organization that has authority over various matters relating to apprenticeship training. **Unlike the Bureau of Apprenticeship and Training, such an organization has participation from businesses, occupational associations, skilled workers, labor unions, apprentice schools, and representatives of the Department of Labor**. In the state of Tennessee, this organization can consist of two levels: (a) the Tennessee Joint Apprenticeship Training Committee and (b) local Joint Apprenticeship Training Committees. The Tennessee Joint Apprenticeship Training Committee is made up of occupation-specific sub-committees--one for each recognized skilled occupation. **In each county, designated geographical area, or labor market-defined region, there is a local Joint**

Apprenticeship Training Committee. The local committee may not contain occupation-specific subcommittees for all recognized skilled occupations.

The Tennessee Joint Apprenticeship Training Committee is primarily responsible for:

1. Identifying, determining, and revising the whole range of skills and knowledge required for a specific officially recognized skilled occupation

2. Identifying, developing, and revising the statewide minimum occupational standards for apprenticeship training for each recognized skilled occupation

3. Developing, revising, and issuing the statewide regulations governing apprenticeship training for each recognized skilled occupation

4. Defining the terms and conditions of initial apprenticeship contracts

5. Developing, maintaining, and updating the examination requirements for each recognized skilled occupation and setting the rules for administering examinations

6. Determining the minimum wages and benefits for apprenticeships in various recognized skilled occupations

7. Determining the content and scope of the apprentice school curricula devoted to occupation-related technical subjects

8. Defining the required qualifications for apprentice school instructors who teach occupation-related technical subjects

9. Registering adult apprenticeship programs and contracts that meet the aforementioned minimum standards but are not registered with the Bureau of Apprenticeship and Training

The main responsibilities of a local Joint Apprenticeship Training Committee include:

1. Determining the size of the "pool" of prospective apprentices through surveys of employment opportunities for each recognized skilled occupation

2. Qualifying screening for prospective apprentices

3. Selecting qualified students for interviews with potential employers

4. Signing initial contracts with apprentices

5. Using the apprenticeship training standards developed by the Tennessee Joint Apprenticeship Training Committee to determine whether businesses and their training personnel have the necessary qualifications to train apprentices for recognized skilled occupations

6. Advising and providing assistance to businesses on apprenticeship training matters

7. Monitoring compliance with the apprenticeship training regulations

8. Ensuring that youth apprentices are not exploited

9. Rotating apprentices among different employers when such a practice is necessary

10. Coordinating on-the-job training with occupation-related technical instruction in apprentice schools

11. Establishing boards of examiners and administering apprenticeship comprehensive examinations

12. Instituting and maintaining a register of qualified on-the-job trainers

13. Training trainers in training methods and techniques

14. Recommending issuance of skilled worker certificates to the Tennessee Department of Labor

15. Recommending issuance of qualified trainer certificates to the Tennessee Department of Labor

16. Developing linkages and making arrangements with the most appropriate or qualified adult apprenticeship programs

Rotation of Apprentices (Practice 4). Apprentices are rotated among different employers by local Joint Apprenticeship Training Committees when businesses which meet the minimum requirements for training apprentices are willing but not able to provide training in the whole range of skills and knowledge required for a given recognized skilled occupation. In remote areas where there are not a sufficient number of firms for rotation, a different arrangement may be approved. On-the-job training may be supplemented by skill training in cooperative training centers which are organized and conducted by local Joint Apprenticeship Training Committees.

Qualifications for In-Company Trainers and Training Companies (Practice 5). Technical and training qualifications are required of all in-company training personnel who train and supervise apprentices. Such requirements include:

1. A minimum of 3 years of practical work experience as a certified skilled worker in a recognized skilled occupation
2. Formal training in methods and techniques for training apprentices both on the job and in the classroom
3. Demonstrated interest in training apprentices
4. Sound character

In-company on-the-job trainers are formally prepared in training methods and techniques through coursework taught by experts designated by a local Joint Apprenticeship Training Committee. **The cost of such training is shared by both the training company and the would-be trainer**. Certified skilled workers who are qualified to train apprentices are issued a qualified trainer certificate by the Tennessee Department of Labor at the recommendation by a local Joint Apprenticeship Training

Committee. **These trainers are re-certified on a regular basis**. The recommended maximum certified trainer/apprentice ratio is one to three.

Besides having qualified trainers, a business that provides apprenticeships is also required to fulfill additional conditions necessary for quality apprenticeship training. Such conditions include:

1. A safe working environment
2. Adequate facilities, equipment, and tools
3. Specified workstations for training and rotation
4. Production and service work processes necessary to facilitate training in the prescribed skills and knowledge

Only businesses that meet the apprenticeship training standards specified by the Tennessee Joint Apprenticeship Training Committee are certified by local Joint Apprenticeship Training Committees as qualified apprenticeship training establishments. **The requirements for qualification should not be restrictive on employers as to how they provide on-the-job training as long as they meet the standards**.

Apprenticeship Wages and Benefits (Practice 6). Apprentices are paid wages and provided with necessary benefits by employers while they are being trained on the job and learning in apprentice schools. **While actual apprentice wages are set by employers, the minimum wages and benefits for apprenticeships in various recognized skilled occupations are determined by the corresponding occupation-specific sub-committees of the Tennessee Joint Apprenticeship Training Committee**. Progressive wage scales are established so that as apprentices acquire more skills and knowledge and become more productive, their wages are increased. Businesses that train apprentices who are initially indentured with local Joint Apprenticeship Training Committees may

choose to pay apprenticeship wages and benefits by themselves or through the local committee or another non-profit organization.

Incentives to Train Young Adults (Practice 7). Incentives are offered by the state so that businesses will be motivated to train young adults through apprenticeships. Among many potentially effective incentives is the practice of categorizing all of a business' apprenticeship training costs as tax-deductible expenses. A "training tax" can also be imposed on companies which do not spend a required percentage of their total payroll on apprenticeship training for young adults. If, however, a company does spend the required percentage or more, then the tax is not assessed. In addition, a public relations campaign may be initiated so that companies that meet the standards and accept the responsibility for training youth apprentices will be recognized as "exemplary training companies" and honored as making an important contribution to the community.

Financing (Practice 8). Apprenticeship training for young adults is financed by training employers, government, and apprentices. In general, an employer who provides such training covers all the on-the-job training costs, including trainers' and apprentices' wages and benefits, instructional materials, and equipment. The state assumes the expenses of occupational counseling and apprentice school education as well as the operational costs of Joint Apprenticeship Training Committees at both the state and local levels. **Apprentices also invest financially in their training through taking "deferred payment" or paying tuition.**

Apprentice School Curricula (Practice 9). The occupation-specific sub-committees of the Tennessee Joint Apprenticeship Training Committee determines the content and scope of the apprentice school curricula devoted to occupation-related technical subjects. **When available and appropriate, national standards are met or exceeded, and existing curricula of established apprenticeship programs are utilized**

or adapted. For each recognized skilled occupation, a curriculum committee formed with representatives from the corresponding sub-committee of the Tennessee Joint Apprenticeship Training Committee and relevant apprentice schools is responsible for developing and revising the occupation-related technical curricula. **Input from apprentice school instructors and apprentices is also reflected in the curricula**.

Qualifications for Apprentice School Instructors (Practice 10). The qualifications for an instructor who teaches occupation-related technical subjects in an apprentice school are decided by the Tennessee Joint Apprenticeship Training Committee. In general, such qualifications are similar to those required to teach adult apprentices, including instructor certification requirements and practical work experiences as a skilled worker in a recognized skilled occupation. **A regular high school vocational teaching certificate may or may not be required to teach occupation-related subjects**.

To update their knowledge about the technological advancements in the occupations they teach, apprentice school instructors need to work and receive continuing training in companies designated by local Joint Apprenticeship Training Committees for a minimum of 200 hours per year. Apprentice school teachers who teach general education subjects need to satisfy the same qualifications as those for regular high school teachers.

Duties and Responsibilities of Employers (Practice 11). The duties and responsibilities of an employer who provides on-the-job training include:

1. Meeting the standards for apprenticeship training
2. Following the regulations governing apprenticeship training
3. Imparting the knowledge and skills necessary for achieving the specified on-the-job training objectives
4. Promoting the positive character and work ethic of apprentices

Duties and Responsibilities of Apprentice Schools (Practice 12). The duties and responsibilities of an apprentice school include:

1. Teaching occupation-related theoretical subjects
2. Providing general high school education for those who start their apprenticeships at the end of the 11th grade
3. Integrating academic education with occupation-related instruction

Duties and Responsibilities of Apprentices (Practice 13). The main duties and responsibilities of an apprentice are:

1. Meeting employer expectations
2. Participating in on-the-job training actively
3. Observing all company rules and policies
4. Passing the required examinations and tests
5. Exercising care in the use of tools, machines, and equipment
6. Maintaining a daily training journal
7. Attending the apprentice school and meeting its requirements

Analysis of the Responses to the Third-Round Questionnaire

The medians, means, and standard deviations of the responses to the third-round questionnaire are shown in Table 5. Like the median ratings in the previous two rounds of questionnaires, all the third-round median ratings of the steps and related practices described in the revised Tennessee Model of Apprenticeship for Young Adults were also 4.0 or above. Six (21%) of the steps and related practices received a median rating of 4.0, and two (7%) of them had a 6.0. All the other steps and related practices (71%) were given a median rating of 5.0. The mean ratings of all the steps and related practices

Table 5. Medians, Means, and Standard Deviations of the Third-Round Ratings by the Delphi Panel

The Revised Model	MD	$\overline{X}$	SD
The Process			
Orientation to the World of Work (Phase I, Step 1)	5.0	4.9	0.90
Pre-vocational Courses (Phase I, Step 2)	5.0	5.1	0.69
Career Exploration Activities (Phase I, Step 3)	6.0	5.4	0.53
Occupational Counseling (Phase I, Step 4)	5.0	5.0	0.58
Apprenticeship Path Decision (Phase I, Step 5)	5.0	4.9	0.69
Qualifying Screening (Phase II, Step 6)	5.0	5.0	0.82
Interview/Selection (Phase II, Step 7)	4.0	4.3	1.11
Initial Contract Signing (Phase III, Step 8)	5.0	5.0	0.58
Initial Probation (Phase IV, Step 9)	5.0	4.9	0.90
On-the-Job Training/Apprentice School (Phase IV, Step 10)	4.0	4.7	0.95
Evaluation (Phase IV, Step 11)	5.0	4.4	1.13
Adult Apprenticeship (Phase IV, Step 12)	4.0	4.3	1.11
Adult Apprenticeship (Phase IV, Step 13)	5.0	4.7	0.76
High School Graduation (Phase V, Step 14)	6.0	5.4	0.79
Skilled Worker Certificate (Phase V, Step 15)	5.0	5.3	0.76

Table 5. (Continued)

The Tentative Model	MD	$\overline{X}$	SD
The Related Practices			
Recognized Skilled Occupations (Practice 1)	5.0	4.9	0.90
Apprenticeship Training Standards and Regulations (Practice 2)	5.0	4.3	0.95
Competent Body (Practice 3)	4.0	4.7	0.95
Rotation of Apprentices (Practice 4)	5.0	4.4	1.27
Qualifications for In-Company Trainers and Training Companies (Practice 5)	4.0	4.3	0.76
Apprenticeship Wages and Benefits (Practice 6)	4.0	4.3	1.11
Incentives to Train Young Adults (Practice 7)	5.0	4.7	1.11
Financing (Practice 8)	5.0	4.7	0.76
Apprentice School Curricula (Practice 9)	5.0	4.9	1.07
Qualifications for Apprentice School Instructors (Practice 10)	5.0	5.0	1.00
Duties and Responsibilities of Employers (Practice 11)	5.0	4.7	0.95
Duties and Responsibilities of Apprentice Schools (Practice 12)	5.0	5.0	0.58
Duties and Responsibilities of Apprentices (Practice 13)	5.0	4.9	0.69
The Entire Model	5.0	5.0	0.58

ranged from 4.3 to 5.4. The lowest and highest standard deviations of the group ratings of the steps and related practices were respectively 0.53 and 1.27. The median, mean, and standard deviation of the third-round ratings of the entire revised model were 5.0, 5.0, and 0.58.

As compared to the responses to the second-round questionnaire, the number of median ratings of 4.0 in the third-round questionnaire about the revised Tennessee Model of Apprenticeship for Young Adults decreased by 1. The number of median ratings of 6.0 increased by 1, and the number of median ratings of 5.0 remained the same. The median rating of the entire model increased from 4.0 in the second-round questionnaire to 5.0 in the third round.

Because more than 50% of the changes suggested by the Delphi panel members in the first-round questionnaire were included in the revised Tennessee Model of Apprenticeship for Young Adults, the mean ratings of 22 (79%) steps and related practices increased in the third-round questionnaire. The other 6 (21%) of the mean ratings remained the same. The mean rating of the entire model increased from 4.4 in the second-round questionnaire to 5.0 in the third round. Fifteen (54%) standard deviations of the group ratings of the steps and related practices decreased in the third-round questionnaire, and eight (29%) of them remained the same. Five (18%) increased, and these increases were the result of raised ratings by some of the panel members on those steps and related practices. The "bandwagon" effect was again not observed. When responding to the third-round questionnaire, each panel member gave at least one rating which was further apart from the corresponding second-round mean rating than their own second-round rating.

The mean of the third-round mean ratings of all the steps and related practices was 4.8, another increase of 0.2 over that of the second-round scores. The small difference of 0.2 between this mean and the third-round group mean rating of 5.0 for the entire revised model indicated for the third time that the panel members' ratings of the individual steps and related practices were comparable with their ratings of the entire model.

Four steps and related practices received the lowest median and mean ratings in the third-round questionnaire. They were Interview/Selection (Phase II, Step 7); Adult Apprenticeship (Phase IV, Step 12); Qualifications for In-Company Trainers and Training Companies (Practice 5); and Apprenticeship Wages and Benefits (Practice 6). Although the mean rating of the step of Apprenticeship Training Standards and Regulations (Practice 2) was also the lowest, its median rating was 5.0. The steps of Career Exploration Activities (Phase I, Step 3) and High School Graduation (Phase V, Step 14) were given the highest median and mean ratings, and the former had the lowest standard deviation. These two steps were best accepted by the Delphi panel in terms of high median and mean ratings and low standard deviation. The practice of Rotation of Apprentices (Practice 4) had the highest standard deviation. This was mainly because one panel member did not agree that apprentices should be rotated among different companies and businesses and gave this practice a very low rating.

Finalized Tennessee Model of Apprenticeship for Young Adults

The analysis of the third-round responses to the revised Tennessee Model of Apprenticeship for Young Adults indicated that the Delphi panel members had reached a positive consensus on all the individual steps and related practices of the revised model as well as the entire model. This positive consensus was also a verification of the panel

members' acceptance of the model. Therefore, the revised model was entirely accepted as the finalized model; no further modifications were made.

For easy communication between the researcher and the participants in the second part of the study, the finalized model was referred to as the Tennessee Model of Apprenticeship for Young Adults in the survey questionnaire and in the executive summary of the model.

Part Two

Descriptive Analysis of the Responses to the Survey Questionnaire

Of the 200 copies of the survey questionnaire mailed to the four sampled groups of major stakeholders, a total of 100 (50%) were returned after the first two mailings and before the follow-up mailing: 24 (48%) from the group Presidents or Chief Executive Officers in Businesses, 20 (40%) from Labor Union Officials, 25 (50%) from Relevant Governmental Officials, and 31 (62%) from Directors of Vocational Education Organizations and Programs. An additional 11 (5.5%) were returned after the follow-up mailing: 3 (6%) from the group Presidents or Chief Executive Officers in Businesses, 5 (10%) from Labor Union Officials, 2 (4%) from Relevant Governmental Officials, and 1 (2%) from Directors of Vocational Education Organizations and Programs. Therefore, the overall return rate after the three mailings was 55.5% (111): 54% (27) from the group Presidents or Chief Executive Officers in Businesses, 50% (25) from Labor Union Officials, 54% (27) from Relevant Governmental Officials, and 64% (32) from Directors of Vocational Education Organizations and Programs. All the returned questionnaires were usable for the subsequent statistical analyses.

Because the overall return rate of 55.5% was not considered high enough, an independent samples *t* test was conducted to compare the mean of the ratings obtained before the follow-up mailing with the mean of the ratings obtained after the follow-up mailing on all three dependent variables--completeness, effectiveness, and implementability of the finalized Tennessee Model of Apprenticeship for Young Adults. Since the two groups of ratings had an unequal number of ratings, the homogeneity of variances was first tested, also on the three dependent variables. The results showed that none of the three *F* tests was significant at the 0.05 level of significance ($F_{complete} = 1.28$, $df = 99, 10$; $F_{effective} = 1.01$, $df = 99, 10$; $F_{implementable} = 1.30$, $df = 99, 10$). The assumption of equal variances was thus supported.

The three *t* tests that were subsequently conducted did not yield a significant difference between the ratings received before the follow-up mailing and those obtained after the follow-up mailing at the 0.05 level of significance on any of the three dependent variables (see Table 6). Since it was not unreasonable to assume that those who responded to the survey questionnaire after the follow-up mailing were characteristic of all the non-respondents, it was, therefore, concluded that the respondents to the survey questionnaire were not different from the non-respondents in their perceptions about the finalized Tennessee Model of Apprenticeship for Young Adults. All of the following statistical analyses used the responses received prior to the follow-up mailing[3].

The medians, means, and standard deviations of the ratings by the four groups of respondents (major stakeholders) about the finalized Tennessee Model of Apprenticeship for Young Adults are shown in Table 7. The median ratings about completeness of the model ranged from 4.0 to 6.0. The rating by the group Unions (Labor Union Officials) was 4.0, and that by the group Education (Directors of Vocational Education

[3] The same statistical results were obtained in a calculation that used all the responses, including those obtained after the follow-up mailing.

Table 6. *t* Tests for the Ratings Obtained Before and After the Follow-up Mailing

	Before Follow-up (N = 100)		After Follow-up (N = 11)		
	$\overline{X}$	SD	$\overline{X}$	SD	*t*
Completeness	5.14	1.28	5.55	1.13	1.01
Effectiveness	4.75	1.48	4.82	1.47	0.15
Implementability	4.25	1.45	4.00	1.27	0.55

Table 7. Medians, Means, and Standard Deviations of the Ratings by Major Stakeholders

	Complete			Effective			Implementable		
Major Stakeholders	MD	$\overline{X}$	SD	MD	$\overline{X}$	SD	MD	$\overline{X}$	SD
Employers	5.0	5.3	1.00	5.0	4.8	1.35	4.0	4.3	1.34
Unions	4.0	4.4	1.39	3.5	3.6	1.32	3.0	3.3	1.17
Government	5.0	5.2	1.17	5.0	5.3	1.22	5.0	4.8	1.20
Education	6.0	5.4	1.36	5.0	5.0	1.49	5.0	4.4	1.65

Organizations and Programs) was 6.0. The other two groups Employers (Presidents or Chief Executive Officers in Businesses) and Government (Relevant Governmental Officials) were in the middle (5.0). The range of the median ratings about effectiveness of the model was from 3.5 to 5.0. The group Unions gave a rating of 3.5, and the other three groups all gave a 5.0. The lowest median rating about implementability of the model was 3.0, and the highest was 5.0. The lowest was given by the group Unions, and the highest was shared by the two groups Government and Education. The group Employers gave a halfway rating of 4.0. All the median ratings were 4.0 or above except for those by the group Unions about effectiveness (3.5) and implementability (3.0) of the model.

The mean ratings were all above 4.0 except for those by the group Unions about effectiveness (3.6) and implementability (3.3) of the model. The highest mean rating was given by the group Education about completeness (5.4).

Of the four groups, the group Government gave the highest mean ratings to effectiveness and implementability of the model, and the group Education gave the highest rating to completeness. The mean ratings by the group Unions about these three aspects of the model all ranked the lowest. The mean of the three mean ratings by the group Unions was 3.8, and those by the groups Employers, Education, and Government were respectively 4.8, 4.9 and 5.1. It appeared that the latter three groups were less different from each other and more positive in their perceptions about the model than the group Unions.

The mean of all the ratings by the four groups about completeness of the model was 5.1, and those about effectiveness and implementability were 4.8 and 4.3. While none of the means of all the ratings by the four groups about any one of the three aspects of perception about the model was below 4.0, it seemed that the model was perceived by the four groups as more complete and effective than implementable.

Analysis of Variance on Three Dependent Variables

Since the number of return rates was not the same among the four groups of respondents, the Bartlett's chi-square procedure was utilized to test the assumption that the scores in each of the four groups had the homogeneous variance on each of the three dependent variables. When the number of ratings in each group and their unbiased variances were applied to the following equation,

$$\chi^2 = \left(\sum_{i=1}^{k} n_i\right) \cdot \ln\left(\frac{\sum_{i=1}^{k} n_i \cdot s_i^2}{\sum_{i=1}^{k} n_i}\right) - \sum_{i=1}^{k} n_i \cdot \ln s_i^2$$

where n was the number of ratings in one group and s^2 was the unbiased variance, the null hypothesis of equal variances was not rejected at the 0.05 level of significance ($\chi^2_{complete} = 3.22, df = 3; \chi^2_{effective} = 1.14, df = 3; \chi^2_{implementable} = 4.15, df = 3$) on any of the three dependent variables. It was thus indicated that the variances were homogenous among all four groups on each of the three dependent variables. The regular one-way analysis of variance procedure was then used for the subsequent statistical analyses.

The raw ratings by the four groups of respondents were used in the three one-way analyses of variance. The results of these analyses showed significant differences at the 0.05 level of significance among the four groups on all three dependent variables (see Tables 8, 9, and 10). The statistical null hypotheses were rejected; therefore, the three alternative hypotheses stated in the section Hypotheses were accepted.

Table 8. One-Way Analysis of Variance on the Dependent Variable of Completeness

Source	*df*	*SS*	*MS*	*F*
Between-Groups	3	14.17	4.72	3.07*
Within-Groups (Error)	96	147.87	1.54	
Total	99	162.04		

* $p < 0.05$

Table 9. One-Way Analysis of Variance on the Dependent Variable of Effectiveness

Source	*df*	*SS*	*MS*	*F*
Between-Groups	3	39.43	13.14	7.12*
Within-Groups (Error)	96	177.32	1.85	
Total	99	216.75		

* $p < 0.05$

Table 10. One-Way Analysis of Variance on the Dependent Variable of Implementability

Source	*df*	*SS*	*MS*	*F*
Between-Groups	3	25.30	8.43	4.41*
Within-Groups (Error)	96	183.45	1.91	
Total	99	208.75		

* $p < 0.05$

In order to determine how the four groups of major stakeholders differed, a Duncan's new multiple range test was conducted on each of the three dependent variables. The results of the three tests, which are summarized respectively in Tables 11, 12, and 13, indicated that on all three dependent variables of completeness, effectiveness, and implementability of the model, only the difference between the mean for the group Unions and the means for all the other three groups was large enough to be statistically significant at the 0.05 level of significance. No other differences were significant.

Table 11. Results of the Duncan's New Multiple Range Test of the Stakeholders' Mean Ratings about Completeness of the Model

Means	A Education 5.4	B Employers 5.3	C Government 5.2	D Unions 4.4	Least Significant Difference
A -- 5.4		0.1	0.2	1.0*	$LSD_2 = 0.70$
B -- 5.3			0.1	0.9*	$LSD_3 = 0.74$
C -- 5.2				0.8*	$LSD_4 = 0.76$
D -- 4.4					

* Significant at the 0.05 level

Table 12. Results of the Duncan's New Multiple Range Test of the Stakeholders' Mean Ratings about Effectiveness of the Model

Means	A Government 5.3	B Education 5.0	C Employers 4.8	D Unions 3.6	Least Significant Difference
A -- 5.3		0.3	0.5	1.7*	$LSD_2 = 0.77$
B -- 5.0			0.2	1.4*	$LSD_3 = 0.81$
C -- 4.8				1.2*	$LSD_4 = 0.84$
D -- 3.6					

* Significant at the 0.05 level

Table 13. Results of the Duncan's New Multiple Range Test of the Stakeholders' Mean Ratings about Implementability of the Model

Means	A Government 4.8	B Education 4.4	C Employers 4.3	D Unions 3.3	Least Significant Difference
A -- 4.8		0.4	0.5	1.5*	$LSD_2 = 0.78$
B -- 4.4			0.1	1.1*	$LSD_3 = 0.83$
C -- 4.3				1.0*	$LSD_4 = 0.85$
D -- 3.3					

* Significant at the 0.05 level

CHAPTER V

DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

About the Model

The finalized Tennessee Model of Apprenticeship for Young Adults consists of a series of benchmark practices identified by a Delphi panel of experts on the basis of a tentative model developed by the researcher as a result of literature review, on-site visits, in-depth interviews, and an international study tour. Many of these practices can be found in the (a) traditional American apprenticeship system, (b) typical youth apprenticeship schemes, and (c) Swiss and German dual systems of vocational training. Some of them were innovatively created. One of the main reasons for using a Delphi panel to help develop the model was to ensure that all cultural, social, economic, and political factors unique to the United States were adequately considered so that the model would be as complete, effective, and implementable as possible.

The model is not meant to be a cure-all type of remedy but a viable alternative in training skilled workers for the workforce and facilitating young people's smooth transition from school to the world of work. It attempts to motivate non-college-bound youth to make high achievements in school and provide them with a real opportunity to mature among adults and acquire the necessary skills of the occupation they have chosen.

A unique feature of this model is its combination of the "best" practices found in traditional American apprenticeship, typical youth apprenticeship, and Swiss and German vocational training. Not all the practices in each system were indiscriminately included in the model; only the benchmark ones that would fit the entire model were selected and

incorporated. The model is, therefore, both similar to and different from all the other models or systems.

Many of the practices contained in the model are "controversial." For example, the practice of allowing a young adult to begin an apprenticeship prior to high school graduation is resisted by a large number of people. The practice of not offering post-secondary academic credits and degrees to youth apprentices is in conflict with one of the frequently advocated principles for youth apprenticeship, although such a practice is a typical one in both the traditional American apprenticeship system and the Swiss and German dual systems of vocational training. The practice of having youth apprentices attend an apprentice school, which is very similar to the German *berufsschule*, is regarded by some people in a very negative perspective.

An effective model is not necessarily implementable, and an implementable model is not necessarily effective. It is possible that the "rigorous" efforts of the researcher in the creation of the tentative Tennessee Model of Apprenticeship for Young Adults and the consensually positive opinions of the Delphi experts about the revised model would ensure effectiveness of the model more than implementability. It should not follow, however, that the model is not implementable. In fact, if the model is effective, it is also very likely to be implementable. Furthermore, without implementation, effectiveness of the model could never be confirmed. Implementability of the model is not exclusively determined by the model itself. Deliberate, sufficient, and efficacious dissemination of the perspective and rationale contained in the model is probably as important as effectiveness of the model in effecting implementation.

About Major Stakeholders' Perceptions about the Model

All the median and mean ratings by the four groups of major stakeholders about the finalized Tennessee Model of Apprenticeships for Young Adults were 4.0 or above except for those by the group Labor Union Officials about effectiveness and implementability of the model. However, the labor union officials' median ratings (3.5 and 3.0) and mean ratings (3.6 and 3.3) on theses two aspects should not be interpreted as negative perceptions about the model. The reason is twofold. First, out of practical considerations, only a three-page executive summary of the model was mailed to the survey subjects along with the survey questionnaire. Because of the limited length, the summary may not have conveyed the essence and rationale of the model in an adequate manner. Many critical and sound elements might not have been included. It is, therefore, not unreasonable to assume that if the respondents in the group Labor Union Officials had read the entire model instead of a short summary, their responses would have been more positive. This assumption also applies to the other three groups of respondents. Second, American labor unions have traditionally been opposed to all kinds of youth apprenticeship practices for fear of potential job replacement. Extremely negative responses would have been given if the model presented to them did not contain many convincingly superior practices for training skilled workers. Labor unions' perceptions about the model should, therefore, be regarded as basically non-negative if their ratings are not extremely negative.

The homogeneity of the variances of the ratings by the four groups of major stakeholders indicates that there is no significant difference among the in-group differences of opinions about completeness, effectiveness, and implementability of the model. Since the largest standard deviation is only 1.65, the differences of opinions within each group of major stakeholders are very small.

Although all four groups of stakeholders are either basically non-negative or generally positive in their perceptions about completeness, effectiveness, and implementability of the model, the group Labor Union Officials is still significantly different from the other three groups in their perceptions in all three aspects. This significant difference shows that at least four things should be done about the model: (a) further revising the model to better meet labor unions' expectations; (b) formulating an implementation strategy that is more agreeable and acceptable to labor unions; (c) implementing the model more in businesses where labor unions do not have dominant control over the training of skilled workers; and (d) implementing the model not just in businesses in which apprenticeship training has been a common workforce development strategy but more in those which have not utilized this strategy.

While the model seems to be regarded by the four groups of major stakeholders as more complete and effective than implementable, it is still generally viewed as implementable. Successful implementation of the model, however, requires careful planning and effective publicity.

Conclusions

On the basis of the analyses of data and results in Chapter IV and the discussions in the preceding two sections of this chapter, the following major conclusions are made:

1. The finalized Tennessee Model of Apprenticeship for Young Adults can provide a set of fundamental guidelines and standards for the state of Tennessee and other states, localities, and communities to develop and implement their apprenticeship systems or programs for young adults.

2. The model can provide base-line information for policy making and/or legislation related to school-to-work transition and apprenticeship training for young adults in various states.

3. The model can positively inform and influence employers, labor unions, governmental officials, and educators in their efforts to train and develop the workforce more effectively and efficiently.

4. The model is generally perceived by major stakeholders to be a complete and effective model for both school-to-work transition and occupational skill training.

5. The model is generally perceived by major stakeholders to be implementable in many industrial and occupational fields.

6. The model should be accepted for pilot testing or implementation in the state of Tennessee as well as in other states, localities, and communities without major modifications.

7. Since the model is generally perceived by major stakeholders to be more effective than implementable, it is highly likely that if it is implemented, it will be effective.

8. For smooth implementation of the model, more efforts need to be made in seeking cooperation and support from labor unions than from business, government, and education.

Recommendations

As a result of this study, the following recommendations are offered:

1. The finalized Tennessee Model of Apprenticeship for Young Adults should be further modified should undetected potential problems emerge during its pilot testing or implementation.

2. The model should be continuously adapted to new and changing conditions.

3. Further studies should be conducted regarding how to improve the model to better meet major stakeholders' needs and expectations for effective and efficient workforce training and development.

4. Further studies should be conducted regarding how to secure cooperation and support from major stakeholders in the implementation of the model.

5. Further studies should be conducted regarding major stakeholders' perceptions about the individual steps and related practices of the model.

6. Further studies should be conducted that would explore the perceptions of more or different stakeholders who will also have an impact on the development and implementation of an apprenticeship system for young adults.

7. Further investigation should be made with respect to why labor unions' perceptions about the model or the youth apprenticeship concept are significantly different from those of business, government, and education and how the gap can be narrowed.

8. This study should be replicated in other states.

LIST OF REFERENCES

References

Adelman, N. E. (1989). *The case for integrating academic and vocational education*. Washington, DC: Policy Studies Associates.

Apling, R. N. (1992). *Youth apprenticeships: Improving school-to-work transition for the "forgotten half"* (CRS Report for Congress). Washington DC: Congressional Research Service, The Library of Congress.

Ashley, W. J. (1966). *An introduction to English economic history and theory*. New York: A. M. Kelley.

Bailey, T. (1993a). Can youth apprenticeship thrive in the United States? *Educational Researcher, 22*(3), 4-10.

Bailey, T. (1993b). Youth apprenticeship in the context of broad education reform. *Educational Researcher, 22*(3), 16-17.

Bailey, T., & Merritt, D. (1993, July, No. 1). Youth apprenticeship: Lessons from the U.S. experience. *Centerfocus*, pp. 1-4. (ERIC Document Reproduction Service No. ED 361 526).

Barbash, J. (1967). Union interests in apprenticeship and other training forms. In N. Dufty (Ed.), *Essays on apprenticeship* (pp. 36-64). Madison, WI: The University of Wisconsin.

Barnes, J. L. (1987). An international study of curricular organizers for the study of technology. *Dissertation Abstracts International, 48*, 05A. (University Microfilms No. AAC8718983)

Barton, P. E. (1989). *Earning and learning: The academic achievement of high school juniors with jobs* (Report No. 17-WL-01). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Barton, P. E., & Kirsch, I. S. (1990). *Workplace competencies: The need to improve literacy and employment readiness*. Washington, DC: U.S. Department of Education.

Becker, O. M. (1906). Modern adaptations of the apprenticeship system. *The Engineering Magazine, 32*(3), 321-338.

Bednarek, D. I. (1990, August 20). Trained youth design the future of Germany. *Milwaukee Journal*, p. C7.

Benglen, D. S. (Ed.). (1989). *Vocational training in Switzerland.* Zurich, Switzerland: Swiss Association for Vocational Guidance.

Berger, U. (Ed.). (1988). *Statistical data on Switzerland.* Berne, Switzerland: Swiss Federal Statistical Office.

Berryman, S. E., Flaxman, E., & Inger, M. (1992). *Building the middle.* Berkeley, CA: National Center for Research in Vocational Education. (ERIC Document Reproduction Service No. ED 362 764).

Bishop, J. (1989). Incentives for learning: Why American high school students compare so poorly to their counterparts overseas. In U.S. Commission on Workforce Quality and Labor Market Efficiency (Ed.), *Investing in people* (Background Papers, Vol. 1). Washington, DC: Editor.

Borus, E. M. (1983). *Tomorrow's workers.* Boston, MA: Lexington Books.

Bray, R. A. (1980). *Boy labour and apprenticeship.* New York: Garland Publishing.

Bridenbaugh, C. (1950). *The colonial craftsman.* New York: New York University Press.

Brustein, M., & Mahler, M. (1994, October). Doling the dollars: School-to-work grant requirements are lengthy and demanding. *Vocational Education Journal*, pp. 19-21.

Bureau of Apprenticeship and Training. (1964). *Training of workers in American industry* (Research Division Report No. 18). Washington, DC: U.S. Government Printing Office.

Bureau of Labor and Management Relations, U.S. Department of Labor. (1989). *Productivity and employment: Challenges for the 1990's* (Bureau of Labor and Management Relations Report No. 132). Washington, DC: U.S. Government Printing Office.

Bureau of Labor Statistics. (1991/1992). Apprenticeship. *Occupational Outlook Quarterly, 35*(4), 27-40.

Campbell, C. P. (1993). The dual system: Business-based apprenticeship training. In C. P. Campbell & R. B. Armstrong (Eds.), *Workforce development in the Federal*

Republic of Germany (pp. 78-100). Pittsburgh, KS: Press International, Pittsburgh State University.

Campbell, C. P., & Armstrong, R. B. (1993). Introduction. In C. P. Campbell & R. B. Armstrong (Eds.), *Workforce development in the Federal Republic of Germany* (pp. 1-7). Pittsburgh, KS: Press International, Pittsburgh State University.

Campbell, C. P., & Cheek, G. D. (1991). Vocational training in Switzerland. *Journal of Industrial Teacher Education, 29*(1), 53-68.

Campbell, C. P., et al. (1993). *School-to-work opportunities systems* (A Position Paper). Leesburg, VA: National Association for Trade and Industrial Education.

Cappelli, P. (1991a). *Are skill requirements rising? Evidence from production and clerical jobs*. Philadelphia, PA: National Center on the Educational Quality of the Workforce, The University of Pennsylvania.

Cappelli, P. (1991b). *Is the "skill gap" really about attitudes?* Philadelphia, PA: National Center on the Educational Quality of the Workforce, The University of Pennsylvania.

Carl Duisberg Gesellschaft. (1991). *Vocational training--investment for the future: The dual system of vocational training in the Federal Republic of Germany* (2nd ed.). Cologne, Germany: Author.

Charner, I, & Fraser, B. S. (1987). *Youth and work: What we know, what we don't know, what we need to know*. Washington, DC: William T. Grant Foundation Commission on Work, Family, and Citizenship.

Cheek, G. D. (1993). The structure of education in Germany. In C. P. Campbell & R. B. Armstrong (Eds.), *Workforce development in the Federal Republic of Germany* (pp. 8-35). Pittsburgh, KS: Press International, Pittsburgh State University.

Cheek, G. D., & Campbell, C. P. (1994). Improving the school-to-employment transition with lessons from abroad. In A. J. Pautler (Ed.), *High school to employment transition: Contemporary issues* (pp. 115-127). Ann Arbor, MI: Prakken Publications.

Clark, V. B. (1952). *Apprenticeship training in the state of Tennessee in cooperation with the public schools*. Unpublished master's thesis, The University of Tennessee, Knoxville.

Coates, J. F. (1975). Review of Sackman report. *Technological Forecasting and Social Change, 7*(2), 193-194.

Comer, R. A., & Lahne, H. J. (1971). *Admission and apprenticeship in the building trades unions*. Washington, DC: U.S. Government Printing Office.

Commission on the Skills of the American Workforce. (1990). *America's choice: High skills or low wages!* Rochester, NY: National Center on Education and the Economy.

Craig, D. G. (1993). Teacher and trainer education. In C. P. Campbell & R. B. Armstrong (Eds.), *Workforce development in the Federal Republic of Germany* (pp. 150-170). Pittsburgh, KS: Press International, Pittsburgh State University.

Cremin, L. (1989). *Popular education and its discontents*. New York: Harper & Row.

Cunico, G. E. (1974). A Delphi approach to the future of industrial education. (Doctoral dissertation, Utah State University). *Dissertation Abstracts International, 34A*, 7565A.

Cunningham, W. (1922). *The growth of English industry and commerce* (Vol. 1). Cambridge, England: The University Press.

Dalkey, N. C., & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science, 9*(3), 458-467.

Dertouzos, M. L., Lester, R. K., Slow, R., & the MIT Commission on Industrial Productivity. (1989). *Made in America: Regaining the productive edge*. Cambridge, MA: MIT Press.

DeParle, J. (1992, November 26). Training high school students how to work. *New York Times*, pp. A1 & D15.

Dickey, K. N. (1981). *Switzerland, a study of the educational system of Switzerland and a guide to the academic placement of students from Switzerland in educational institutions of the United States*. Washington, DC: American Association of Collegiate Registrars and Admissions Officers.

Dole, E. (1989, October 26). *State of the workforce address*. Speech delivered to the State Teachers and Principals of the Year ceremony, Washington, DC.

Dougherty, C. (1987). The German dual system: A heretical view. *European Journal of Education, 22*(2), 195-199.

Douglas, P. H. (1921). *American apprenticeship and industrial education*. New York: Columbia University Press.

Egger, E. (1984). *Education in Switzerland*. Berne, Switzerland: Swiss Conference of Cantonal Directors of Education.

Elbaum, B. (1989). Why apprenticeship persisted in Britain but not in the United States. *The Journal of Economic History, 49*(2), 337-349.

European Centre for the Development of Vocational Training. (1983). *Professional liberation and training of trainers in member states of the European communities* (Synthesis Report). Berlin, Germany: Author.

Evans, R. N. (1968). School for schooling's sake: The current role of the secondary school in occupational preparation. In Princeton University Industrial Relations Section (Ed.), *The transition from school to work: A report based on the Princeton manpower symposium, May 9-10, 1968* (Research Report Series No. 111, pp. 189-209). Princeton, NJ: Editor.

Federal Committee on Apprenticeship. (1992). *The meaning of apprenticeship: When and how to use the term. A Policy recommendation*. Washington, DC: Author. (ERIC Document Reproduction Service No. ED 342 924).

Federal Minister for Education and Science. (1992). *Vocational training in the dual system in the Federal Republic of Germany: An investment in the future*. Bonn, Germany: Author.

Fendt, P. F. (1978, October). Alternative futures for adult and continuing education in North Carolina: A Delphi futures planning study. Paper presented at the first meeting of the Education Section of the World Future Society, Houston, TX. (ERIC Document Reproduction Service No. ED 162 545).

Filipczak, B. (1992). Apprenticeships from high school to high skills. *Training, 29*(4), 23-29.

Filipczak, B. (1993). Bridging the gap between school and work. *Training, 30*(12), 44-47.

Finegold, D. (1993, March). Making apprenticeships work. *RAND Issue Papers* (Issue 1), pp. 1-6.

Flower, F., & Russell, T. J. (Eds.). (1982). The industrial tutor in the Federal Republic of Germany. *Studies in vocational education and training in the Federal Republic of Germany* (Paper No. 4). Blagdon, England: Further Education Staff College, Coombe Lodge.

Foltman, F. F. (1964). Public policy in apprenticeship training and skill development. In Senate Committee on Labor and Public Welfare (Ed.), *The role of apprenticeship in manpower development: United States and Western Europe* (Vol. III of *Selected readings in manpower*). Washington, DC: U.S. Government Printing Office.

Gehan, S. M. (1990). *Apprenticeship training* (Report No. 41). Washington, DC: AFL-CIO Department of Economic Research.

General Accounting Office. (1992). *Apprenticeship training: Administration, use, and equal opportunity* (Report No. GAO/HRD-92-43). Washington, DC: Author. (ERIC Document Reproduction Service No. ED 343 010).

Geraldi, V. A. (1981). The effects of on-the-job training and formal related instruction on apprentice job proficiency in selected apprenticeship programs. *Dissertation Abstracts International, 33*, 649A. (University Microfilms No. 82-14, 520).

Glover, R. W. (1980). *Apprenticeship in the United States: Implications for vocational education research and development* (Occasional Paper No. 66). Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University.

Glover, R. W. (1983). Collaboration in apprentice programs: Experience with in-school apprenticeships. *Collaboration: Vocational education and the private sector* (1984 Yearbook of the American Vocational Association). Arlington, VA: American Vocational Association.

Glover, R. W. (1986). *Apprenticeship lessons from abroad* (Information Series No. 305). Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University. (ERIC Document Reproduction Service No. ED 268 374).

Glover, R. W. (1988). *Expanding the use of apprenticeship* (A Report to the Bureau of Apprenticeship and Training, U.S. Department of Labor).

Glover, R. W. (1991). *Reflections on approaches to engage industry in the youth apprenticeship movement*. Unpublished manuscript, LBJ School of Public Affairs, The University of Texas, Austin.

Gordon, T. J., & Helmer, O. (1964). *Report on a long-range forecasting study* (p-2982). Rand.

Grossman, G. M., & Drier, H. N. (1988). *Apprenticeship 2000: The status of and recommendations for improved counseling, guidance, and information processes.* Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University.

Hamilton, S. F. (1985). *Apprenticeship as a transition to adulthood in West Germany.* Paper presented at the annual meeting of the American Educational Research Association, Chicago.

Hamilton, S. F. (1990). *Apprenticeship for adulthood: Preparing youth for the future.* New York: The Free Press.

Hamilton, S. F. (1993). Prospects for an American-style youth apprenticeship system. *Educational Researcher*, *22*(3), 11-16.

Hamilton, S. F., & Hamilton, M. A. (1992a). A progress report on apprenticeships. *Educational Leadership*, *49*(6), 44-47.

Hamilton, S. F., & Hamilton, M. A. (1992b). Learning at work. In J. E. Rosenbaum et al. (Eds.), *Youth apprenticeship in America: Guidelines for building an effective system* (pp. 17-23). Washington, DC: The William T. Grant Foundation Commission on Work, Family, and Citizenship.

Hamilton, S. F., Hamilton, M. A., & Wood, B. J. (1991). *Creating apprenticeship opportunities for youth.* Ithaca, NY: Cornell University.

Hanson, R. R., & Pierce, R. H. (1993). The career development experience in German education. In C. P. Campbell & R. B. Armstrong (Eds.), *Workforce development in the Federal Republic of Germany* (pp. 36-55). Pittsburgh, KS: Press International, Pittsburgh State University.

Haque, M. M. (1983). Implications for education in developing countries. *Dissertation Abstracts International*, *44*, 05A. (University Microfilms No. AAC8318747)

Harrington-Lueker, D. (1993). Preserving American know-how. *American School Board Journal*, *180*(11), 24-29.

Haskell, R. W. (1993). The dual system: Admission criteria, progression and evaluation. In C. P. Campbell & R. B. Armstrong (Eds.), *Workforce development in the*

Federal Republic of Germany (pp. 56-77). Pittsburgh, KS: Press International, Pittsburgh State University.

Hatcher, T. G. (1993). *The work ethic of apprentices and instructors in a trade union apprenticeship training program*. Unpublished doctoral dissertation, The University of Tennessee, Knoxville.

Helmer, O. (1975). Foreword. In H. A. Linstone & M. Turoff (Eds.), *The Delphi method: Techniques and applications* (pp. xix-xx). Reading, MA: Addison-Wesley.

Herschbach, D. R., Hays, F. B., & Evans, D. P. (1992). *Vocational education and training: Review of experience*. Washington, DC: U.S. Agency for International Development.

Hudelson, D. (1994, September). In Washington. *Vocational Education Journal*, pp. 21-22.

Isaac, S., & Michael, W. B. (1981). *Handbook in research and education* (2nd ed.). San Diego, CA: EdITS.

Isbell, C. H. (1980). The goals of industrial arts teacher educators in the future (1985-2000). (Doctoral dissertation, Texas A&M University). *Dissertation Abstracts International, 41*, 07A.

Jacoby, D. (1991). The transformation of industrial apprenticeship in the United States. *The Journal of Economic History, 51*(4), 887-910.

Jobs for the Future. (1991a). *New training strategies for a high performance metalworking industry* (Report of a Conference). Cambridge, MA: Author.

Jobs for the Future. (1991b). *Essential elements of youth apprenticeship programs, A Preliminary Outline*. Cambridge, MA: Author.

Jobs for the Future. (1993). *Learning that works: A youth apprenticeship briefing book*. Boston, MA: Author. (ERIC Document Reproduction Service No. ED 357 255).

Kablaoui, B. N., & Pautler, A. J. (1994). In A. J. Pautler (Ed.), *High school to employment transition: Contemporary issues* (pp. 85-95). Ann Arbor, MI: Prakken Publications.

Kazis, R. (1991). *Toward defining workable models for youth apprenticeship*. Unpublished manuscript, Jobs for the Future, Sommerville, MA.

Kazis, R. (1992). A commentary. In J. E. Rosenbaum et al. (Eds.), *Youth apprenticeship in America: Guidelines for building an effective system* (pp. 67-71). Washington, DC: The William T. Grant Foundation Commission on Work, Family, and Citizenship.

Krais, B., & Krebstakies, M. (1983). *Trainers and teachers in vocational training in the Federal Republic of Germany*. Berlin, Germany: European Centre for the Development of Vocational Training.

Krekeler, N. (1986). *Learning for the working world: Vocational training in the Federal Republic of Germany* (Monograph No. BW Nr. 3-4e). Bonn, Germany: Inter Nationes.

Kursh, H. (1958). *Apprenticeships in America: A guide to golden opportunities in industry*. New York: W. W. Norton & Company.

Lebergott, S. (1984). *The Americans: An economic record*. New York: W. W. Norton & Company.

Leff, L. (1992, April 5). Even at B-CC [Bethesda-Chevy Chase High School], the temptation is just to slide by. *Washington Post*, p. A22.

Lerman, R. I., & Pouncy, H. (1990a). The compelling case for youth apprenticeships. *The Public Interest, 101*, 62-77.

Lerman, R. I., & Pouncy, H. (1990b). *Why America should develop a youth apprenticeship system* (Policy Report No. 5). Washington, DC: Progress Policy Institute. (ERIC Document Reproduction Service No. ED 359 325).

Lillydahl, J. (1990, Summer). Academic achievement and part-time employment of high school students. *Journal of Economic Education*, pp. 307-316.

Linstone, H. A., & Turoff, M. (1975). Introduction. In H. A. Linstone & M. Turoff (Eds.), *The Delphi method: Techniques and applications* (pp. 3-12). Reading, MA: Addison-Wesley Publishing Company.

Mangum, G. L. (1975). Manpower training and apprenticeship: Their roles in a national manpower policy. In M. E. Strong (Ed.), *Developing the nation's work force*. Washington, DC: American Vocational Association.

Marland, S. P. (1974). *Career education: A proposal for reform*. New York: McGraw-Hill Book Company.

Marsden, D, Trinder, C., & Wagner, K. (1986). Measures to reduce youth unemployment in Britain, France and West Germany. *National Institute Economic Review, 117*, 43-51.

Marshall, J. A. (1984). Major responsibilities of future industrial teacher education department leaders. *Dissertation Abstracts International, 45*, 05A. (University Microfilms No. AAC8417766)

Marshall, F. R., & Briggs, V. M. (1967). *The negro and apprenticeship*. Baltimore, MD: The John Hopkins Press.

Marshall, W., & Schram, M. (1993). *Mandate for change*. New York: Berkeley Books.

Marshall, R., & Tucker, M. (1992). *Thinking for a living: Education and the wealth of nations*. New York: Basic Books.

Martino, J. P. (1973). Methods of technological forecasting. In W. Hahn & K. Gordon (Eds.), *Assessing the future and policy planning* (pp. 19-40). New York: Gordon & Breach Science.

Maurizio, D. M. (1983). Industrial education in the information age: A survey of potential changes identified by industrial educators. *Dissertation Abstracts International, 45*, 01A. (University Microfilms No. AAC8712640)

McNeil, L. M. (1984). *Lowering expectations: The impact of student employment on classroom knowledge*. Madison, WI: Wisconsin Center for Educational Research. (ERIC Document Reproduction Service No. ED 242 941).

Mishel, L., & Bernstein, J. (1992). *The state of working America, 1992-1993*. Washington, DC: Economic Policy Institute.

Mitchell, J. P. (1977, January). New directions for apprenticeship policy. *Worklife* (U.S. Department of Labor, Employment and Training Administration).

Morris, R. B. (1965). *Government and labor in early America*. New York: Octagon Books.

Morrison, J. L., Renfro, W. L., & Boucher, W. I. (1984). *Futures research and the strategic planning process: Implications for higher education* (ASHE-ERIC Higher Education Research Report No. 9). Washing, DC: Association for the Study of Higher Education.

Motley, J. M. (1907). Apprenticeship in American trade unions. In J. M. Vincent, J. H. Hollander, & W. W. Willoughby (Eds.), *John Hopkins University studies in historical and political science: Vol. 25. International and colonial history*. Baltimore, MD: John Hopkins Press.

Munch, J. (1986). *Vocational training in the Federal Republic of Germany*. Berlin, Germany: European Centre for the Development of Vocational Training.

Mynatt, M. D. (1992). *A strategic planning model for a bureaucratic organization involved in work force planning*. Unpublished doctoral dissertation, The University of Tennessee, Knoxville.

National Alliance of Business. (1992). *Real jobs for real people: An employer's guide for youth apprenticeship*. Washington, DC: Author.

National Coalition for Advanced Manufacturing. (1993). *Preparing technical workers for the new industrial era: The need for a fundamental shift in federal policy toward technical education* (Position Paper). Washington, DC: Author.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: U.S. Government Printing Office.

Nothdurft, W. E. (1989). *Schoolwork: Reinventing public schools to create the workforce of the future*. Washington, DC: The Brookings Institution.

Nothdurft, W. E. (1990). *Youth apprenticeship, American style: A strategy for expanding school and career opportunities* (Report of a Conference, Washington, DC, December 7, 1990). Green Bay, WI: Northeast Wisconsin Technical College. (ERIC Document Reproduction Service No. ED 330 860).

Organisation for Economic Co-operation and Development. (1979). *Policies for apprenticeship*. Paris, France: Author.

Osterman, P. (1980). *Getting started: The youth labor market*. Cambridge, MA: MIT Press.

Passmore, D. L. (1994). Expectations for entry-level workers: What employers say they want. In A. J. Pautler (Ed.), *High school to employment transition: Contemporary issues* (pp. 23-29). Ann Arbor, MI: Prakken Publications.

Patterson, W. F., & Hedges, M. H. (1946). *Educating for industry: Policies and procedures of a national apprenticeship system*. New York: Prentice-Hall.

Peak, M. H., & Matthes, K. (1992, March). Lessons out of school: The German benchmark in training. *Management Review*, pp. 54-57.

Perrone, V., Landry, R., Ahler, J., Traugh, C., Hill, R., Dahl, I., Larson, J., Williams, J., & King, L. (1981). *Secondary school students and employment*. Grand Forks, ND: North Dakota University, Bureau of Educational Research and Service. (ERIC Document Reproduction Service No. ED 212 774).

Petty, D. M. (1987). *The identification and perceived importance of special competencies for deafness rehabilitation specialists*. Unpublished doctoral dissertation, The University of Tennessee, Knoxville.

Porter, G. B. (1986). *Federal Republic of Germany, a study of the educational system of the Federal Republic of Germany and a guide to the academic placement of students in educational institutions of the United States*. Washington, DC: American Association of Collegiate Registrars and Admission Officers.

Quimby, I. (1984). Introduction: Some observations on the craftsman in early America. In I. Quimby (Ed.), *The craftsman in early America* (pp. 3-16). New York: W. W. Norton & Company.

Raggatt, P. (1988). Quality control in the dual system of West Germany. *Oxford Review of Education*, *14*(2), 163-186.

Raizen, S. (1989). *Performing education for work: A cognitive science perspective*. Berkeley, CA: The University of California, National Center for Research in Vocational Education.

Rasp, A. (1973). Delphi: A decision-maker's dream. *Nation's Schools*, *92*(1), 29-32.

Renzi, A. (1977). Evaluation of the related instruction curriculum for electrical wireman apprenticeship (Doctoral dissertation, State University of New York, Buffalo, 1977). *Dissertation Abstracts International*, *37*, 5577A.

Resnick, L. B. (1987). Learning in school and out. *Educational Researcher*, *16*(9), 13-20.

Reubens, B. G. (1980). *Apprenticeship in foreign countries* (U.S. Department of Labor R&D Monograph No. 77). Washington, DC: U.S. Government Printing Office.

Riccucci, N. M. (1991). Apprenticeship training in the public sector: Its use and operation for meeting skilled craft needs. *Public Personnel Management*, *20*(2), 181-193.

Rorabaugh, W. J. (1986). *The craft apprentice: From Franklin to the machine age in America*. Oxford, England: Oxford University Press.

Rosenbaum, J. E. (1992). Apprenticeship learning: Principles for connecting schools and workplaces. In J. E. Rosenbaum et al. (Eds.), *Youth apprenticeship in America: Guidelines for building an effective system* (pp. 1-6). Washington, DC: The William T. Grant Foundation Commission on Work, Family, and Citizenship.

Russell, R. (1982). *Learning about work in the Federal Republic of Germany* (Paper No. 11). Blagdon, England: The Further Education Staff College, Coombe Lodge. (ERIC Document Reproduction Service No. ED 240 239).

Russell, T. J. (1984). *The institutional background for the transition from school to working life in the Federal Republic of Germany* (Paper No. 1881). Blagdon, England: The Further Education Staff College, Coombe Lodge. (ERIC Document Reproduction Service No. ED 265 301).

Sackman, H. (1974). *Delphi critique: Expert opinion, forecasting, and group process*. Lexington, MA: Lexington Books/D.C. Heath & Company.

Salinger, S. V. (1987). *Labor and indentured servants in Pennsylvania, 1682-1800*. Cambridge, England: Cambridge University Press.

Schwarz, B., Svedin, U., & Wittrock, B. (1982). *Methods in futures studies: Problems and applications*. Boulder, Colorado: Westview Press.

Secretary's Commission on Achieving Necessary Skills. (1991). *What work requires of school: A SCANS report for America 2000*. Washington, DC: Author.

Seybolt, R. F. (1917). *Apprenticeship and apprenticeship education in colonial New England and New York*. New York: Teachers College, Columbia University.

Shanahan, W. F. (1983). *Guide to apprenticeship programs*. New York: Arco Publishing.

Shenon, C. (1992). *Union perspectives on new work-based youth apprenticeship initiatives*. Cambridge, MA: Jobs for the Future. (ERIC Document Reproduction Service No. ED 341 845).

Shigetomi, S. (1971). An analysis of the related instruction program for electrical apprentices (Doctoral dissertation, University of California, Los Angeles, 1971). *Dissertation Abstracts International, 31*, 6379A.

Sikes, G. C. (1894). The apprenticeship system in the building trades. *The Journal of Political Economy, 2*, 397-423.

Smith, D. F. (1975). *A study of the middle school arts program as perceived by middle school experts and middle school teachers.* Unpublished doctoral dissertation, The University of Maryland, College Park.

Starkweather, K. N. (1975). *A study of potential directions for industrial arts toward the year 2000 A.D.* Unpublished doctoral dissertation, The University of Maryland, College Park.

Steinberg, L., & Dornbush, S. M. (1991). Negative correlates of part-time employment during adolescence: Replication and elaboration. *Developmental Psychology, 27*(3), 304-313.

Steiner, G. (1983). *Current problems in vocational education in Switzerland: Report on a national research program* (Occasional Paper No. 93). Columbus, OH: The National Center for Research in Vocational Education. (ERIC Document Reproduction Service No. ED 239 108).

Stern, D. (1992). School-based work experience. In J. E. Rosenbaum et al. (Eds.), *Youth apprenticeship in America: Guidelines for building an effective system* (pp. 7-15). Washington, DC: The William T. Grant Foundation Commission on Work, Family, and Citizenship.

Swiss Federal Office for Industry and Labour. (1988). *Introducing BIGA.* Zurich, Switzerland: Author.

Tanney, L. A. (1978). A Delphi study of consumer and homemaking program development and research needs in Maryland based on the 1976 vocational education amendments. (Doctoral dissertation, The University of Maryland). *Dissertation Abstracts International, XX*, 5370-A.

Tifft, S. E. (1992). *The challenge: To enhance the competitiveness of American workers through a system of youth apprenticeship that forges stronger links between enterprises and schools* (EQW Issues). Philadelphia, PA: National Center on the Educational Quality of Workers. (ERIC Document Reproduction Service No. ED 349 473).

U.S. Department of Labor. (1970). *Apprenticeship past and present.* Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor. (1979). *Apprenticeship and CETA technical assistance guide*. Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor. (1987). *Setting up an apprenticeship program*. Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor. (1989). *Work-based learning: Training America's workers*. Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor. (1992). *Training and employment report of the secretary of labor*. Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor. (1993a). *Apprenticeship past and present*. Washington, DC: U.S. Government Printing Office.

U.S. Department of Labor. (1993b). *National apprenticeship program*. Washington, DC: U.S. Government Printing Office.

Volk, K. S. (1993). Technology education in developing countries: Curriculum guidelines for program design and evaluation. *Journal of Industrial Teacher Education, 30*(4), 68-85.

von Gilardi, R., & Schulz, W. (1989). *In-firm trainers of young people in the framework of the dual vocational training system of the Federal Republic of Germany*. Berlin, Germany: European Centre for the Development of Vocational Training.

Webb, S. (1896). *The history of trade unionism* (2nd ed.). London, England: Longmans, Green, & Company.

Wikström, S. (1974). *Våra dagligvarors distribution*. Stockholm, Sweden: Liber.

William T. Grant Foundation Commission on Work, Family, and Citizenship. (1988). *The forgotten half: Pathways to success for America's youth and young families* (Final Report). Washington, DC: Author.

William T. Grant Foundation Commission on Work, Family, and Citizenship. (1991). *States and communities on the move: Policy initiatives to create a world-class workforce*. Washington, DC: Author.

Wilson, S. E. (1993). Improved workforce training and job skills development: The new global imperative. In C. P. Campbell & R. B. Armstrong (Eds.), *Workforce development in the Federal Republic of Germany* (pp. 310-328). Pittsburgh, KS: Press International, Pittsburgh State University.

Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago, IL: The University of Chicago Press.

Wirtz, W. P., Rohbeck, A. C., Charner, I., & Fraser, S. B. (1987). *Intense employment while in high school: Are teachers, guidance counselors, and parents misguiding academically oriented adolescents?* Washington, DC: George Washington University, Graduate Institute for Policy Education and Research.

Wonacott, M. E. (1992, No. 142). Apprenticeship and the future of the work force. *ERIC Digest*, pp. 1-2.

Yasuda, K. E. (1990). *Working and schooling decisions: A study of New Hampshire teenage labor market behavior and the level of educational attainment* (First Interim Report). NH: New Hampshire Department of Employment Security.

APPENDIXES

APPENDIX A

FIRST-ROUND QUESTIONNAIRE OF THE DELPHI STUDY

First-Round Questionnaire of the Delphi Study

Directions

Please read carefully the two-part tentative Tennessee Model of Apprenticeship for Young Adults as well as the explanation. After reading the model and the explanation, rate, on a scale ranging in the descending order from 6 to 1, (a) each of the 15 steps described in the first part of the model, (b) each of the 13 related practices explicated in the second part, and (c) the entire model. The six point values are defined as:

6 = strongly agree
5 = agree
4 = partially agree
3 = partially disagree
2 = disagree
1 = strongly disagree

If you select 6 or 5 for a certain step/practice or the entire model, you do not need to suggest any changes of the descriptions, but you may if you wish. If you select 4, 3, 2, or 1, please provide your suggested changes, not just criticisms. You may also add steps or practices. The questionnaire is divided into three parts: (a) the process, (b) the related practices, and (c) the entire model.

The Process

	Strongly Agree					Strongly Disagree
Orientation to the World of Work (Phase I, Step 1)	6	5	4	3	2	1

Suggested Changes: _____

_____

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Pre-vocational Courses (Phase I, Step 2)	6	5	4	3	2	1

Suggested Changes: _____

_____

Career Exploration Activities
(Phase I, Step 3) 6 5 4 3 2 1

Suggested Changes: _____

Occupational Counseling
(Phase I, Step 4) 6 5 4 3 2 1

Suggested Changes: _____

Apprenticeship Path Decision
(Phase I, Step 5) 6 5 4 3 2 1

Suggested Changes: _____

Qualifying Screening
(Phase II, Step 6) 6 5 4 3 2 1

Suggested Changes: _____

Interview/Selection
(Phase II, Step 7) 6 5 4 3 2 1

Suggested Changes: _____

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Initial Contract Signing
(Phase III, Step 8) 6 5 4 3 2 1

Suggested Changes: _____

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Initial Probation
(Phase IV, Step 9) 6 5 4 3 2 1

Suggested Changes: _____

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On-the-Job Training/Apprentice School
(Phase IV, Step 10) 6 5 4 3 2 1

Suggested Changes: _____

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Evaluation
(Phase IV, Step 11) 6 5 4 3 2 1

Suggested Changes: _____

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Adult Apprenticeship
(Phase IV, Step 12) 6 5 4 3 2 1

Suggested Changes: _____

Adult Apprenticeship
(Phase IV, Step 13) 6 5 4 3 2 1

Suggested Changes: _____

High School Graduation
(Phase V, Step 14) 6 5 4 3 2 1

Suggested Changes: _____

Skilled Worker Certificate
(Phase V, Step 15) 6 5 4 3 2 1

Suggested Changes: _____

Step Added 6 5 4 3 2 1

Descriptions: _____

Step Added 6 5 4 3 2 1

Descriptions: _____

Step Added 6 5 4 3 2 1

Descriptions: _____

The Related Practices

	Strongly Agree					Strongly Disagree
Recognized Skilled Occupations (Practice 1)	6	5	4	3	2	1

Suggested Changes: _____

Apprenticeship Training Standards and Regulations (Practice 2) 6 5 4 3 2 1

Suggested Changes: _____

Competent Body
(Practice 3) 6 5 4 3 2 1

Suggested Changes: _____

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Rotation of Apprentices
(Practice 4) 6 5 4 3 2 1

Suggested Changes: _____

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Qualifications for In-Company Trainers
and Training Companies
(Practice 5) 6 5 4 3 2 1

Suggested Changes: _____

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Apprenticeship Wages and Benefits
(Practice 6) 6 5 4 3 2 1

Suggested Changes _____

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Incentives to Train Young Adults
(Practice 7) 6 5 4 3 2 1

Suggested Changes: _____

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Financing
(Practice 8) 6 5 4 3 2 1

Suggested Changes: _____

Apprentice School Curricula
(Practice 9) 6 5 4 3 2 1

Suggested Changes: _____

Qualifications for Apprentice School Instructors
(Practice 10) 6 5 4 3 2 1

Suggested Changes: _____

Duties and Responsibilities of Employers
(Practice 11) 6 5 4 3 2 1

Suggested Changes: _____

Duties and Responsibilities of Apprentice Schools
(Practice 12) 6 5 4 3 2 1

Suggested Changes: _____

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Duties and Responsibilities of Apprentices
(Practice 13) 6 5 4 3 2 1

Suggested Changes: _____

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Practice Added 6 5 4 3 2 1

Descriptions: _____

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Practice Added 6 5 4 3 2 1

Descriptions: _____

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Practice Added 6 5 4 3 2 1

Descriptions: _____

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The Entire Model

	Strongly Agree					Strongly Disagree
The Entire Model	6	5	4	3	2	1

Suggested Changes: _____

_____

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APPENDIX B

COVER LETTER FOR THE FIRST-ROUND QUESTIONNAIRE

(Date)

(Name)
(Address)

Dear :

Thank you very much for agreeing to participate on the Delphi panel for determining the benchmark practices for an apprenticeship system for young adults. You were chosen because of your knowledge of apprenticeship training, your understanding of youth problems, and your commitment to upholding standards for workforce development. Your role in this important project is to guide us in developing an effective and efficient apprenticeship training model for young adults.

Enclosed please find (a) a tentative Tennessee Model of Apprenticeship for Young Adults, (b) an explanation of the tentative model, and (c) a first-round questionnaire. The purpose of this questionnaire is to obtain opinions and suggested changes from the panel members about this tentative model. It is extremely important that you answer each question.

Please follow the directions in the questionnaire and return your completed questionnaire in the pre-addressed, postage-paid return envelope as soon as possible. For the Delphi study, there will be a total of three rounds of questionnaires. All opinions and suggested changes will be kept anonymous. Please keep the tentative model and the explanation for use in the following rounds.

Again, thank you for your willingness to participate. We will inform you of the progress and mail you a copy of the final findings.

Sincerely,

Bing Yao

APPENDIX C

SECOND-ROUND QUESTIONNAIRE OF THE DELPHI STUDY

Second-Round Questionnaire of the Delphi Study

Directions

Re-read the tentative Tennessee Model of Apprenticeship for Young Adults along with the explanation. After reading the model and the explanation, (a) compare your own first-round ratings of the steps, practices, and entire model with the mean ratings by the whole panel, (b) provide your changed ratings where they are appropriate to you, (c) rate each of the changes suggested in the first-round questionnaire, and (d) rate each step and practice added in the first-round questionnaire. A rating scale ranging in the descending order from 6 to 1 is used. The six point values are defined as:

6 = strongly agree
5 = agree
4 = partially agree
3 = partially disagree
2 = disagree
1 = strongly disagree

Your own ratings and the mean ratings provided by the whole panel in the first-round questionnaire are indicated in bold and underlined characters. The second-round questionnaire is also divided into three parts: (a) the process, (b) the related practices, and (c) the entire model.

The Process

	Strongly Agree					Strongly Disagree
Orientation to the World of Work (Phase I, Step 1)						
Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.4**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1
Suggested Changes						
The orientation should start at the end of the ninth grade or later.	6	5	4	3	2	1
The orientation should be competency-based.	6	5	4	3	2	1

Students need to be made aware of the issues of physical fitness and substance abuse and their implications for the workplace.	6	5	4	3	2	1
People from occupations, not school counselors and teachers, should deliver the orientation content.	6	5	4	3	2	1
Labor representatives should participate in the delivery of the orientation content.	6	5	4	3	2	1
Occupational clusters (groups) need to be defined in this step.	6	5	4	3	2	1
Students should be encouraged to review their tentative career development plans with parents and adjust as appropriate.	6	5	4	3	2	1

Pre-vocational Courses
(Phase I, Step 2)

Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.6**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Special efforts should be made to relate academic subjects such as mathematics and science to the pre-vocational experiences.	6	5	4	3	2	1
Pre-vocational teachers can be either regular vocational teachers or academic teachers as long as they have the qualifications to deliver these courses.	6	5	4	3	2	1
The qualifications for pre-vocational teachers need to be specified in this step.	6	5	4	3	2	1

Career Exploration Activities
(Phase I, Step 3)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	**5.3**	4	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

This step should occur earlier, e.g., no later than the middle of the ninth grade.	6	5	4	3	2	1
This step should not begin before the 10th grade.	6	5	4	3	2	1
Parents should be actively involved in their children's career exploration activities.	6	5	4	3	2	1

Occupational Counseling
(Phase I, Step 4)

Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.6**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

This step should be initiated no later than the beginning of the 10th grade.	6	5	4	3	2	1
Occupational counselors' credentials must include apprenticeship and/or employment experience out of the school environment.	6	5	4	3	2	1
Occupational counseling should provide comparisons between skilled and professional jobs.	6	5	4	3	2	1
Occupational counseling should emphasize the importance of mathematics and science courses which relate to the occupational clusters (groups).	6	5	4	3	2	1

Apprenticeship Path Decision
(Phase I, Step 5)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	**4.7**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

This decision should be postponed until after high school graduation.	6	5	4	3	2	1

Students should be allowed to "try out" one or two work environments before they make the decision.	6	5	4	3	2	1

Qualifying Screening
(Phase II, Step 6)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	**4.9**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Local Joint Apprenticeship Training Committees, rather than the state-level committee, should be responsible for determining the size of the "pool."	6	5	4	3	2	1
The qualifications should include prior work, volunteer, and leadership experience.	6	5	4	3	2	1
The General Aptitude Test Battery administered by the Employment Commission can be used in the screening.	6	5	4	3	2	1
A standard and consistent procedure should be in place to eliminate nepotism.	6	5	4	3	2	1
A remedial process should be in place for students who do not qualify.	6	5	4	3	2	1

Interview/Selection
(Phase II, Step 7)

Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	4	**3.6**	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Apprenticeship interviews should not be conducted by employers.	6	5	4	3	2	1

Applicants should be interviewed and selected by local Joint Apprenticeship Training Committees and sent to different companies as apprenticeship positions become available.	6	5	4	3	2	1
Applicants need a class to learn and develop interviewing skills.	6	5	4	3	2	1

Initial Contract Signing
(Phase III, Step 8)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	**4.4**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

The words "legally binding" should be deleted from the descriptions of this step.	6	5	4	3	2	1
Initial contracts should also include provisions about holidays, illness, and rights under the National Labor Relations Act.	6	5	4	3	2	1
All elements in an initial youth apprenticeship contract should be governed by the existing federal regulations regarding apprenticeship training.	6	5	4	3	2	1
Initial contracts should be registered with a state apprenticeship council/agency or the Bureau of Apprenticeship and Training.	6	5	4	3	2	1

Initial Probation
(Phase IV, Step 9)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	**5.1**	4	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Justification should be required of either the employer or the apprentice to terminate the contract during the initial probationary period.	6	5	4	3	2	1

After the initial probationary period, the apprentice must reimburse the employer and/or the local Joint Apprenticeship Training Committee for the training expenses if he or she quits the program.	6	5	4	3	2	1

On-the-Job Training/Apprentice School
(Phase IV, Step 10)

Your Rating:	6	5	4	**3**	2	1
Panel's Mean Rating:	6	5	4	**3.9**	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

On-the-job training should take no more than 3 days per week.	6	5	4	3	2	1
Prior to high school graduation, youth apprentices should spend full weeks alternately on the job and in the apprentice school.	6	5	4	3	2	1
If the apprentice quits school during the training period, he or she should be terminated.	6	5	4	3	2	1
A free-standing apprentice school should not be established for occupation-related theoretical instruction and general education; integration with community colleges, area technical centers, or even high schools would be a better alternative.	6	5	4	3	2	1
Youth apprentices should attend the same evening classes as for adult apprentices for occupation-related instruction.	6	5	4	3	2	1
A local Joint Apprenticeship Training Committee should have the authority to decide who is responsible for providing occupation-related theoretical instruction.	6	5	4	3	2	1
Apprentice schools should be housed only in area technical centers, not in community colleges.	6	5	4	3	2	1
Youth apprentices should not be required to keep a training journal prior to high school graduation.	6	5	4	3	2	1

Evaluation
(Phase IV, Step 11)

Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.3**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

One comprehensive examination is not enough; testing should be continuous.	6	5	4	3	2	1
An interim examination should be required during the initial-year apprenticeship training, and a passing grade must be made in both the practice and theory parts to continue the program.	6	5	4	3	2	1
Comprehensive examinations should be developed by local Joint Apprenticeship Training Committees, but administered by training employers.	6	5	4	3	2	1

Adult Apprenticeship
(Phase IV, Step 12)

Your Rating:	6	5	4	**3**	2	1
Panel's Mean Rating:	6	5	**4.6**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Passing of a comprehensive examination should not be required as a prerequisite for entering an adult apprenticeship program; a high school graduation diploma or a certificate of initial mastery of academic skills should be adequate.	6	5	4	3	2	1

Adult Apprenticeship
(Phase IV, Step 13)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	**5.0**	4	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Same as the suggestion for Phase IV, Step 12	6	5	4	3	2	1

High School Graduation
(Phase V, Step 14)

Your Rating:	**6**	5	4	3	2	1
Panel's Mean Rating:	6	**5.0**	4	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Youth apprentices who receive a high school graduation diploma should have the same level of academic achievement as other comprehensive high school graduates.	6	5	4	3	2	1

Skilled Worker Certificate
(Phase V, Step 15)

Your Rating:	**6**	5	4	3	2	1
Panel's Mean Rating:	6	**5.1**	4	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

The skill credential should be called Certificate of Program Completion.	6	5	4	3	2	1
The skill credential should be recognized by the Bureau of Apprenticeship and Training.	6	5	4	3	2	1

Steps Added

None

The Related Practices

	Strongly Agree					Strongly Disagree
Recognized Skilled Occupations (Practice 1)						
Your Rating:	6	5	4	3	**2**	1

Panel's Mean Rating:	6	5	**4.4**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

The suggested legislation is not necessary.	6	5	4	3	2	1
Employers' access to the labor market should not be restricted by any enforced formal training requirements.	6	5	4	3	2	1

Apprenticeship Training Standards and Regulations
(Practice 2)

Your Rating:	6	5	4	3	**2**	1
Panel's Mean Rating:	6	5	**4.0**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

None

Competent Body
(Practice 3)

Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.3**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

In order to avoid conflict with existing trade-specific joint apprenticeship training committees, the name Joint Apprenticeship Training Committee should be changed in this proposed model.	6	5	4	3	2	1
The jurisdictional issues between the proposed Tennessee Joint Apprenticeship Training Committee and the Bureau of Apprenticeship and Training need to be addressed.	6	5	4	3	2	1
It is not necessary for a local Joint Apprenticeship Training Committee to contain occupation-specific committees for all recognized skilled occupations.	6	5	4	3	2	1

The areas served by local Joint Apprenticeship Training Committees should be structured by defined labor markets rather than counties or other geo-political boundaries.	6	5	4	3	2	1
The item of "ensuring that youth apprentices are not exploited" is not necessary.	6	5	4	3	2	1

Rotation of Apprentices
(Practice 4)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	**4.4**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Such a practice should be subject to the desires of the employer and the apprentice.	6	5	4	3	2	1
Apprentices should not be rotated among different companies and businesses.	6	5	4	3	2	1

Qualifications for In-Company Trainers and Training Companies
(Practice 5)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	4	**3.9**	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

The requirements for qualification should not be restrictive on employers as to how they provide on-the-job training.	6	5	4	3	2	1
A minimum of 4 years of practical work experience should be required.	6	5	4	3	2	1
A minimum of 5 years of practical work experience should be required.	6	5	4	3	2	1

Provisions regarding training in training methods and techniques and the financial support should be addressed in the model.	6	5	4	3	2	1
Training employers should pay for on-the-job trainers' training in training methods and techniques.	6	5	4	3	2	1
Training employers and would-be trainers should share the cost of training in training methods and techniques.	6	5	4	3	2	1
The certified trainer/apprentice ratio should be eliminated from the model.	6	5	4	3	2	1
The certified trainer/apprentice ratio should be one to one.	6	5	4	3	2	1
Another impartial body should be responsible for certifying in-company trainers and training companies.	6	5	4	3	2	1
In-company trainers should be re-certified on a regular basis.	6	5	4	3	2	1

Apprenticeship Wages and Benefits
(Practice 6)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	**4.0**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Necessary benefits should include health, welfare, and retirement plans transferable from employer to employer.	6	5	4	3	2	1
Apprentice wages and benefits should be set by employers rather than the Tennessee Joint Apprenticeship Training Committee.	6	5	4	3	2	1

Incentives to Train Young Adults
(Practice 7)

Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.9**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

No incentives from the state government are necessary; a well-trained workforce is the greatest incentive for employers.	6	5	4	3	2	1

Financing
(Practice 8)

Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.6**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

The cost of apprenticeship training, including the expenses of apprentice school education, should be covered entirely by employers; no government funding is necessary.	6	5	4	3	2	1
Youth apprentices also need to invest financially in their training.	6	5	4	3	2	1

Apprentice School Curricula
(Practice 9)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	**4.3**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

Occupation-related curricula should be developed and revised by industry and then approved or disapproved by the Tennessee Joint Apprenticeship Training Committee.	6	5	4	3	2	1
Input from apprentice school instructors and apprentices should be reflected in curricula.	6	5	4	3	2	1

Existing curricula of established apprenticeship programs should be utilized or adapted.	6	5	4	3	2	1

Qualifications for Apprentice School Instructors
(Practice 10)

Your Rating:	6	5	4	**3**	2	1
Panel's Mean Rating:	6	5	**4.4**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

The qualification requirements for an apprentice school instructor who teaches occupation-related technical subjects should be a bachelor's degree plus 5 years of journeyman-level work experience.	6	5	4	3	2	1
A regular high school vocational teaching certificate should not be required to teach occupation-related technical subjects in the apprentice school.	6	5	4	3	2	1
Upgrade training should be designated in hours, not in months.	6	5	4	3	2	1
The apprentice school instructor who teaches occupation-related technical subjects should be working in the occupation or spend at least 10 weeks every year working in a company.	6	5	4	3	2	1

Duties and Responsibilities of Employers
(Practice 11)

Your Rating:	6	**5**	4	3	2	1
Panel's Mean Rating:	6	5	**4.7**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

None

Duties and Responsibilities of Apprentice Schools
(Practice 12)

Your Rating:	6	**5**	4	3	2	1

Panel's Mean Rating: 6 5 **4.7** 3 2 1
Your Changed Rating (if it is changed): 6 5 4 3 2 1

Suggested Changes

None

Duties and Responsibilities of Apprentices
(Practice 13)
Your Rating: 6 **5** 4 3 2 1
Panel's Mean Rating: 6 5 **4.7** 3 2 1
Your Changed Rating (if it is changed): 6 5 4 3 2 1

Suggested Changes

None

Practices Added

Disciplinary practices for youth apprentices should be added to the model. 6 5 4 3 2 1

The practice of protecting youth apprentices from being abused should be specified in the model. 6 5 4 3 2 1

The Entire Model

	Strongly Agree					Strongly Disagree
The Entire Model						
Your Rating:	6	5	**4**	3	2	1
Panel's Mean Rating:	6	5	**4.1**	3	2	1
Your Changed Rating (if it is changed):	6	5	4	3	2	1

Suggested Changes

An apprenticeship system for young adults should not be a public-private partnership. 6 5 4 3 2 1

Youth apprenticeships should not begin until after high school graduation. 6 5 4 3 2 1

High school juniors who have achieved a certificate of initial mastery of basic academic skills should be eligible to start apprenticeship training.	6	5	4	3	2	1
Recruitment of youth apprentices should be more frequent than once per year.	6	5	4	3	2	1

APPENDIX D

COVER LETTER FOR THE SECOND-ROUND QUESTIONNAIRE

(Date)

(Name)
(Address)

Dear :

Thanks to your prompt and complete response to the first-round questionnaire about the tentative Tennessee Model of Apprenticeship for Young Adults, the second-round questionnaire was successfully developed. Your help is appreciated.

Enclosed is the second-round questionnaire. The purpose of this questionnaire is twofold: (a) to allow the Delphi panel members to make necessary adjustments in their first-round ratings after they compare their own ratings with the mean ratings by the whole panel and (b) to obtain opinions from the panel members about the changes suggested and the steps and practices added in the first-round questionnaire.

Please follow the directions in the questionnaire. Since this questionnaire only requires rating and is not very time-consuming, please return your completed questionnaire in the pre-addressed, postage paid return envelope within 2 weeks.

Looking forward to your timely response,

Sincerely,

Bing Yao

APPENDIX E

THIRD-ROUND QUESTIONNAIRE OF THE DELPHI STUDY

Third-Round Questionnaire of the Delphi Study

Directions

Read the revised Tennessee Model of Apprenticeship for Young Adults carefully. After reading the revised model, rate each of the steps and practices as well as the entire model on a rating scale ranging in the descending order from 6 to 1. The six point values are defined as:

6 = strongly agree
5 = agree
4 = partially agree
3 = partially disagree
2 = disagree
1 = strongly disagree

The third-round questionnaire is also composed of three parts: (a) the process, (b) the related practices, and (c) the entire model.

The Process

	Strongly Agree					Strongly Disagree
Orientation to the World of Work (Phase I, Step 1)	6	5	4	3	2	1
Pre-vocational Courses (Phase I, Step 2)	6	5	4	3	2	1
Career Exploration Activities (Phase I, Step 3)	6	5	4	3	2	1
Occupational Counseling (Phase I, Step 4)	6	5	4	3	2	1
Apprenticeship Path Decision (Phase I, Step 5)	6	5	4	3	2	1
Qualifying Screening (Phase II, Step 6)	6	5	4	3	2	1

Interview/Selection (Phase II, Step 7)	6	5	4	3	2	1
Initial Contract Signing (Phase III, Step 8)	6	5	4	3	2	1
Initial Probation (Phase IV, Step 9)	6	5	4	3	2	1
On-the-Job Training/Apprentice School (Phase IV, Step 10)	6	5	4	3	2	1
Evaluation (Phase IV, Step 11)	6	5	4	3	2	1
Adult Apprenticeship (Phase IV, Step 12)	6	5	4	3	2	1
Adult Apprenticeship (Phase IV, Step 13)	6	5	4	3	2	1
High School Graduation (Phase V, Step 14)	6	5	4	3	2	1
Skilled Worker Certificate (Phase V, Step 15)	6	5	4	3	2	1

The Related Practices

	Strongly Agree					Strongly Disagree
Recognized Skilled Occupations (Practice 1)	6	5	4	3	2	1
Apprenticeship Training Standards and Regulations (Practice 2)	6	5	4	3	2	1
Competent Body (Practice 3)	6	5	4	3	2	1
Rotation of Apprentices (Practice 4)	6	5	4	3	2	1

Qualifications for In-Company Trainers and Training Companies (Practice 5)	6	5	4	3	2	1
Apprenticeship Wages and Benefits (Practice 6)	6	5	4	3	2	1
Incentives to Train Young Adults (Practice 7)	6	5	4	3	2	1
Financing (Practice 8)	6	5	4	3	2	1
Apprentice School Curricula (Practice 9)	6	5	4	3	2	1
Qualifications for Apprentice School Instructors (Practice 10)	6	5	4	3	2	1
Duties and Responsibilities of Employers (Practice 11)	6	5	4	3	2	1
Duties and Responsibilities of Apprentice Schools (Practice 12)	6	5	4	3	2	1
Duties and Responsibilities of Apprentices (Practice 13)	6	5	4	3	2	1

The Entire Model

	Strongly Agree					Strongly Disagree
The Entire Model	6	5	4	3	2	1

APPENDIX F

COVER LETTER FOR THE THIRD-ROUND QUESTIONNAIRE

(Date)

(Name)
(Address)

Dear :

Thank you again for your timely response to the second-round questionnaire. Based on the statistical analyses of all the panel members' responses to the second-round questionnaire, the tentative Tennessee Model of Apprenticeship for Young Adults has been revised. The purpose of this questionnaire is to verify the panel members' opinions about the revised model.

Enclosed are the third-round questionnaire and the revised Tennessee Model of Apprenticeship for Young Adults. Please follow the directions in the questionnaire and return the completed questionnaire in the pre-addressed, postage-paid return envelope within 2 weeks.

Looking forward to your early response,

Sincerely,

Bing Yao

APPENDIX G

SURVEY ON THE TENNESSEE MODEL OF APPRENTICESHIP FOR YOUNG ADULTS

Bing Yao
415 Claxton Addition
The University of Tennessee
Knoxville, TN 37996

Survey on the Tennessee Model of Apprenticeship for Young Adults

	Strongly Agree						Strongly Disagree
The model* is complete.	7	6	5	4	3	2	1
The model* is effective.	7	6	5	4	3	2	1
The model* is Implementable.	7	6	5	4	3	2	1

* The Tennessee Model of Apprenticeship for Young Adults

APPENDIX H

EXECUTIVE SUMMARY OF THE TENNESSEE MODEL OF APPRENTICESHIP FOR YOUNG ADULTS

Tennessee Model of Apprenticeship for Young Adults

Executive Summary

The Tennessee Model of Apprenticeship for Young Adults consists of two parts: (a) the process and (b) the related practices.

The Process

The Tennessee apprenticeship system for young adults depends on the cooperative efforts of employers, labor organizations, education, and government. It combines on-the-job training in the workplace with instruction in an apprentice school. The employer takes the lead and provides structured, practical, and employment-relevant work experiences while the apprentice is on the job. The apprentice school offers both instruction in occupation-related theory and general education coursework. The school curricula are coordinated with on-the-job training. After the initial year of such training and schooling, apprentices are indentured into regular adult apprenticeship programs. High school diplomas and/or skilled worker certificates are issued to those who meet specified requirements.

This apprenticeship system for young adults consists of five phases, each of which is comprised of a number of steps.

Orientation to the World of Work (Phase I, Step 1). The secondary (or sometimes primary) school provides students with an orientation to the world of work no later than the beginning of the eighth grade. It is an organized program that helps students begin the process of making a decision about their future. It also informs them that youth apprenticeship is an alternative to other educational or training programs.

Pre-vocational Courses (Phase I, Step 2). The secondary school offers pre-vocational courses through both theoretical instruction and hands-on experiences. Besides learning the fundamental work-related knowledge and skills and developing a positive attitude toward work, students may become aware of the physiological and psychological requirements of the occupational clusters (groups) that interest them. Special efforts are made to integrate academic subjects with pre-vocational courses.

Career Exploration Activities (Phase I, Step 3). No later than the middle of the ninth grade, the secondary school arranges career exploration activities for students who show interest in obtaining occupational preparation through an apprenticeship. These activities facilitate students' exposure to various skilled occupations and workplaces and people working in them. Examples of some important activities include presentations by incumbent skilled workers, informational visits to businesses, and shadowing experiences.

Occupational Counseling (Phase I, Step 4). Occupational counseling is arranged for secondary school students no later than the beginning of the 10th grade. For those who choose to begin their apprenticeships after high school graduation, such counseling may be arranged at the beginning of the 12th grade.

Occupational counseling services are offered by an organization that is outside of the school system and has both the necessary counseling abilities and accurate, up-to-date, and adequate information about the frequently changing characteristics, conditions, and requirements of various skilled occupations. This organization is equipped with all the necessary apprenticeship-related information along with a wide range of presentation media. Occupational counselors must have apprenticeship and/or employment experience outside the school environment.

Apprenticeship Path Decision (Phase I, Step 5). Following specific occupational counseling, students who are serious about apprenticeship training are asked to make career decisions and prepare for subsequent qualifying screening.

Qualifying Screening (Phase II, Step 6). Interested and qualified students are screened and selected by a local Joint Apprenticeship Training Committee to become part of a "pool" of prospective apprentices. Being in a "pool" of prospective apprentices, however, does not guarantee being selected into an apprenticeship program. The size of a "pool" is determined by the local Joint Apprenticeship Training Committee based on employment opportunities.

Interview/Selection (Phase II, Step 7). Local Joint Apprenticeship Training Committees begin to select qualified young people from the "pool" for interviews with potential employers in the middle of the students' 11th grade. Interviews with students who want to start their apprenticeships after high school graduation can be arranged in the middle of the students' 12th grade.

Initial Contract Signing (Phase III, Step 8). Students who are offered and accept apprenticeship positions are required to sign initial contracts (indentures) with local Joint Apprenticeship Training Committees.

Initial Probation (Phase IV, Step 9). There is a 3- to 6-month probation for each apprenticeship. In case of contract termination, the apprentice may be put back into the "pool" and assisted in finding another apprenticeship position if he or she has been in compliance with the conditions specified in the initial contract. Those who start their initial probation at the end of the 11th grade but have had their contracts terminated need to go back to their high schools to complete their education.

On-the-Job Training/Apprentice School (Phase IV, Step 10). On-the-job training of apprentices normally starts at the end of the 11th grade. Apprentices acquire practical occupational skills and paid work experience under the guidance of qualified trainers.

While apprentices are involved in the workplace-based training, they also attend an apprentice school. Such a school offers occupation-related theoretical subjects as well as general education courses needed for high school graduation.

For those who start their apprenticeships after high school graduation, there is a different arrangement. The school curriculum for such apprentices is devoted exclusively to occupation-related theoretical subjects.

Apprentices are required to keep a daily training journal.

Evaluation (Phase IV, Step 11). In-company trainers review their apprentices' daily training journals and monitor their on-the-job performance and work progress on a regular basis. Apprentice schools also systematically evaluate apprentices through observation, review of assignments, and testing.

Depending on the occupation, each apprentice is given at least one comprehensive examination during the initial indenture. Based on both theory and practice, this examination determines the progress that the apprentice has made in acquiring the necessary skills and knowledge.

Adult Apprenticeship (Phase IV, Step 12). Starting the 2nd year of apprenticeship training, that is, after an apprentice's high school graduation, the program turns into an adult apprenticeship program. The initial year of on-the-job training and occupation-related instruction counts as the 1st year of adult apprenticeship training.

Adult Apprenticeship (Phase IV, Step 13). This step is identical to Step 12 except that it is for those who start their apprenticeships after high school graduation.

High School Graduation (Phase V, Step 14). Apprentices who complete high school general education requirements in an apprentice school are issued a regular high school graduation diploma.

Skilled Worker Certificate (Phase V, Step 15). Apprentices who meet all the specified training requirements in their adult apprenticeship programs are issued a portable skilled (journeyman-level) worker certificate.

The Related Practices

Recognized Skilled Occupations (Practice 1). The Tennessee Department of Labor is responsible for identifying, determining, revising, and recognizing various apprenticeable skilled occupations in the state. Formally recognized apprenticeable skilled occupations include fields in which the traditional apprenticeship system is not involved, such as agriculture, health and human services, banking, communications, sales, office administration, and government and public services. A recognized apprenticeable skilled occupation must be broad enough to allow the development of comprehensive knowledge and skills.

Apprenticeship Training Standards and Regulations (Practice 2). Statewide occupational standards for apprenticeship training must be established. The Tennessee Joint Apprenticeship Training Committee is responsible for identifying, developing, and revising such standards for each recognized skilled occupation.

In addition to the standards, there should also be a set of statewide regulations governing apprenticeship training for each recognized skilled occupation. The Tennessee Joint Apprenticeship Training Committee is responsible for developing, revising, and issuing such regulations. Overseeing the implementation of the issued regulations is a responsibility of local Joint Apprenticeship Training Committees.

These standards and regulations are coordinated with the curricula in apprentice schools.

Competent Body (Practice 3). A competent body is an organization that has authority over various matters relating to apprenticeship training. Such an organization has participation from businesses, occupational associations, skilled workers, labor unions, apprentice schools, and representatives of the Department of Labor.

In the state of Tennessee, this organization can consist of two levels: (a) the Tennessee Joint Apprenticeship Training Committee and (b) local Joint Apprenticeship Training Committees. The Tennessee Joint Apprenticeship Training Committee is made up of occupation-specific sub-committees--one for each recognized skilled occupation. In each county, designated geographical area, or labor market-defined region, there is a local Joint Apprenticeship Training Committee.

Rotation of Apprentices (Practice 4). Apprentices are rotated among different employers by local Joint Apprenticeship Training Committees when businesses which meet the minimum requirements for training apprentices are willing but not able to provide training in the whole range of skills and knowledge required for a given recognized skilled occupation.

Qualifications for In-Company Trainers and Training Companies (Practice 5). Technical and training qualifications are required of all in-company training personnel who train and supervise apprentices. Such requirements include practical work experiences and formal training in training methods and techniques.

Besides having qualified trainers, a business that provides apprenticeships is also required to fulfill additional conditions necessary for quality apprenticeship training. Such conditions include a safe working environment and production/service work processes necessary to facilitate training in the prescribed skills and knowledge.

Apprenticeship Wages and Benefits (Practice 6). Apprentices are paid wages and provided with necessary benefits by employers while they are being trained on the job and learning in apprentice schools. Progressive wage scales are established so that as apprentices acquire more skills and knowledge and become more productive, their wages are increased.

Incentives to Train Young Adults (Practice 7). Incentives are offered by the state so that businesses will be motivated to train young adults through apprenticeships. Among many potentially effective incentives is the practice of categorizing all of a business' apprenticeship training costs as tax-deductible expenses, imposing a "training tax," and initiating a public relations campaign to recognize exemplary training companies.

Financing (Practice 8). Apprenticeship training for young adults is financed by training employers, government, and apprentices. In general, an employer who provides such training covers all the on-the-job training costs. The state assumes the expenses of occupational counseling and apprentice school education as well as the operational costs of Joint Apprenticeship Training Committees. Apprentices also invest financially in their training through taking "deferred payment" or paying tuition.

Apprentice School Curricula (Practice 9). For each recognized skilled occupation, a curriculum committee formed with representatives from the corresponding sub-committee of the Tennessee Joint Apprenticeship Training Committee and relevant apprentice schools is responsible for developing and revising the occupation-related technical curricula.

Qualifications for Apprentice School Instructors (Practice 10). In general, the qualifications for an instructor who teaches occupation-related technical subjects in an apprentice school are similar to those required to teach adult apprentices, including instructor certification requirements and practical work experiences as a skilled worker in a recognized skilled occupation.

To update their knowledge about the technological advancements in the occupations they teach, apprentice school instructors need to work and receive continuing training in companies for a minimum of 200 hours per year. Apprentice school teachers who teach general education subjects need to satisfy the same qualifications as those for regular high school teachers.

Duties and Responsibilities of Employers (Practice 11). The duties and responsibilities of an employer who provides on-the-job training include meeting the standards for apprenticeship training, following the regulations governing apprenticeship training, imparting the knowledge and skills necessary for achieving the specified on-the-job training objectives, and promoting the positive character and work ethic of youth apprentices.

Duties and Responsibilities of Apprentice Schools (Practice 12). The duties and responsibilities of an apprentice school include teaching occupation-related theoretical subjects, providing general high school education for those who start their apprenticeships at the end of the 11th grade, and integrating academic education with occupation-related instruction.

Duties and Responsibilities of Apprentices (Practice 13). The main duties and responsibilities of an apprentice are to meet employer expectations; participate in on-the-job training; observe company rules and policies; pass required examinations; exercise care in the use of tools, machines, and equipment; maintain a daily training journal; and attend the apprentice school and meet its requirements.

APPENDIX I

COVER LETTER FOR THE SURVEY QUESTIONNAIRE

(Date)

(Name)
(Address)

Dear :

Apprenticeship for young adults is becoming a significant movement. This training scheme attempts to (a) combine employer-provided on-the-job training with school-based occupation-related instruction, (b) integrate academic education with vocational training, and (c) connect adolescence with adulthood. It focuses on the training of skilled workers needed by business and industry.

With the help of a panel of experts, we have developed a Tennessee Model of Apprenticeship for Young Adults. This model contains a range of expert-identified benchmark practices for an apprenticeship system. We are now trying to verify the feasibility of the model through examining major stakeholders' perceptions about and reactions to it.

You have been selected to respond to the enclosed three-item postcard-type questionnaire. Your opinions about the model are extremely important because they will help indicate whether or not the system can be successfully implemented. Your ratings in the questionnaire will be kept anonymous and confidential; only group average ratings will be reported. When the study is completed, we will send you a copy of the survey results.

We will sincerely appreciate it if you would read the enclosed executive summary of the model and then rate the three statements on the pre-addressed, postage-paid postcard. Please return the completed card within 2 weeks.

Sincerely,

Clifton P. Campbell
Professor

Bing Yao
Research Associate

APPENDIX J

SECOND POSTCARD

Bing Yao
415 Claxton Addition
The University of Tennessee
Knoxville, TN 37996

Name
Address

(Date)

Dear :

A postcard-type questionnaire about the Tennessee Model of Apprenticeship for Young Adults was mailed to you about two weeks ago. If you have completed and mailed back the questionnaire, please accept our heartfelt thanks. If you have not found the time to complete and return it, we sincerely hope you will take the time soon. Your response is extremely important because it will help determine whether or not the model can be successfully implemented.

Sincerely,

Clifton P. Campbell
Professor

Bing Yao
Research Associate

APPENDIX K

FOLLOW-UP LETTER TO NON-RESPONDENTS

(Date)

(Name)
(Address)

Dear :

About 4 weeks ago, we mailed you a three-item postcard-type questionnaire about the Tennessee Model of Apprenticeship for Young Adults. Unfortunately, we have not received your returned questionnaire as yet.

If you have not found the time to complete and return the questionnaire, we sincerely hope you will take the time to do it as soon as you can. In case the mail was misplaced, we have enclosed a replacement survey questionnaire and an additional copy of the executive summary of the model.

We will appreciate it immensely if you would read the executive summary and then rate the three statements on the pre-addressed, postage-paid postcard. Please return the completed postcard as soon as possible.

Sincerely,

Clifton P. Campbell
Professor

Bing Yao
Research Associate

VITA

Bing Yao was born in Shanghai, China on June 9, 1957. After high school graduation, he worked as a farming machinery maintenance technician for two years. In 1982, he received a Bachelor's degree with a major in English at Fudan University in Shanghai. In the following 8 years, Mr. Yao taught at several post-secondary institutions and worked in various positions in business and industry.

In January 1990, Mr. Yao came to the United States and entered The University of Tennessee, Knoxville. In August 1991, he obtained a Master of Science degree in Curriculum and Instruction. In the following semester, he started his doctoral studies, also at The University of Tennessee, Knoxville, and in August 1995, he received a Doctor of Philosophy degree in Education. Since Mr. Yao came to the United States, he has worked as an instructor, instructional technologist, and research associate with several educational and business organizations.

Mr. Yao has authored several articles dealing with issues of human resource development and vocational-technical education and presented papers at a number of professional conferences. He is also active in a number of professional associations. He has received recognition and awards for his academic and professional achievements.

Mr. Yao enjoys reading, social gatherings, and outdoor activities. He is married to Min Zhang, and they have a son, Benjamin.