A study to assess the post-treatment effectiveness of pedagogical instruction for union apprenticeship instructors

James Giblin Cregg

Joseph English

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A STUDY TO ASSESS THE POST-TREATMENT EFFECTIVENESS OF
PEDAGOGICAL INSTRUCTION FOR UNION APPRENTICESHIP INSTRUCTORS

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education

by
James Giblin Cregg
June 1994
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Approved by:

Joseph L. English, First Reader

Ronald K. Pendleton, Second Reader
Abstract

This study was designed to gather quantitative information regarding pedagogical competencies learned during the summer Apprenticeship Instructors Institute funded by the Electrical Training Trust of California, International Brotherhood of Electrical Workers (I.B.E.W). The institute was directed by Dr. Joseph English, Department of Vocational and Adult Education, California State University, San Bernardino, California. Surveys were sent to 60 electrical apprenticeship instructors who had completed the institute. Quantitative ranking analysis was done to determine the extent to which pedagogical competencies learned during the I.B.E.W. summer Apprenticeship Instructors Institute program were currently being applied in existing apprenticeship programs. Results of the study indicated a very high retention and usage of all competencies learned by apprenticeship instructors during the institute.
ACKNOWLEDGEMENTS

The persistence, consistence, consciousness, and determination of Dr. Joe English must be acknowledged, because without his guiding hand, words of encouragement, and careful prodding through the thesis process, it would not have been completed. Both myself and California State University, San Bernardino have grown through his involvement in the Vocational Education Graduate Studies program. I would like to thank Dr. Ron Pendleton for graciously reading this thesis. A special appreciation goes to Marty Hunt and all I.B.E.W. instructors who participated in the study. A very special acknowledgement must go to my mother, Mary Alice Cregg, who after 35 years in the teaching profession inspired me to pursue my education. Most especially, I thank my wife, Kathleen, who saw me through this project and gave me the inspiration that I needed to persist until the project was completed. She is my life long partner and most importantly my best friend.
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CHAPTER I
INTRODUCTION

Background

The widely used word for this decade in the United States seems to be vocational education. The need for such education in the United States is paramount in order to produce a nation at least equal to some of the more prosperous countries such as Germany and Japan. As an instructor in computer information systems, we see daily the need for instructors to be adequately educated in the area of effective teaching skills. More skilled teachers need to be able to pass their knowledge to unskilled workers to produce a society of qualified, highly skilled workers able to get this nation up to par with other productive nations.

Recently, individuals participated in a unique model project which took a group of apprentice instructors and placed them in a formal training program. The pedagogical competencies will produce instructors who not only could convey their knowledge to apprentices in the electrical field, but do so in a professional, highly skilled manner.

An Apprenticeship Instructor’s Institute was held on July 18 -25 1992 at California State University, San Bernardino. This program was designed to enable participants to meet the requirements for California’s part time Vocational Instructional Credential. Two courses were
offered and were designed to provide pedagogical competencies. The participants received course material in modular format with each course requiring six modules. The participants attended class sessions in the daytime, and the evening was set aside for individual study programs. The program dealt with adult learners, each with different needs, aspirations, backgrounds, abilities, and learning styles.

State Department's of Education frequently set certification requirements and give credit for experience in the trade and formal education course work. This program provided apprenticeship instructors with the minimal basic vocational teaching competencies to complement their extensive trade experience. (Rice, 1982).

The two week training session dealt with preparing apprentice instructors to work with adult learners utilizing modules in EVOC 501 - Principles and Methods for Teaching Designated Subjects and EVOC 518 - Field Work in Designated Subjects.

Staff evaluation teams indicated that throughout the week long intensive training program, enthusiasm and dedication of the students to better their teaching skills were most impressive. This enthusiasm was the catalyst for this decision to do a follow up study to determine to what extent students from the N.E.C.A/I.B.E.W Apprenticeship
Instructors Institute were currently utilizing teaching skills learned during the training institute.

**Nature of the Problem**

In reviewing apprenticeship instructional models prior to the training institute, it was determined that vast skills existed in the trade but the overall knowledge of pedagogical competencies did not exist. This problem also occurs in industry, education, and business where highly skilled individuals are unable to train fellow workers and other instructors. Getting in touch with how people learn is essential to a productive economy. Instructors, also, did not meet California’s part-time Vocational Instructional Credential requirements. Instructors in industry are not required to meet any kind of instructional credentialing prior to accepting a teaching or supervisor position.

**Significance of the Study**

Apprenticeship is a unique, voluntary training system through which individuals acquire technical skills and related knowledge for a specific occupation. Training combines daily on-the-job instruction in manipulative skills with periodic classroom instruction in technical subjects related to work requirements (Rice & Spetz, 1982). According to the Ryan Act, California requires that part-time related
instructors working in state secondary industrial education systems be approved for a Designated Subjects Teaching Credential. The Designated Subjects Teaching Credential requires an apprentice instructor to possess qualifying experience, such as completion of his or her own indentured apprenticeship and minimum of two additional years of work experience. Preparing quality trade instructors to teach should top the educational priority list. This study will help determine to what extent a university teacher education model is effective in preparing IBEW journeymen to be apprenticeship instructors by determining to what extent the skills learned are being used in the current program.

Services that result from Vocational Education apprenticeship instructor association should provide apprenticeship with assessment, associate degree programs, curriculum development projects, instructor training and advisory board participation. A strong collaborative partnership will be maintained between vocational education and the private sector.

Purpose of the Study

The purpose of the study was to determine the extent to which pedagogical competencies taught during the I.B.E.W. summer Apprenticeship Instructors Institute program were currently being applied in existing apprenticeship programs.
Questions Guiding the Study

Questions regarding the effectiveness of training programs as post training have the ability to measure and test post training settings and have always presented problems for evaluators. This was the case during the Summer Apprenticeship Instructors Institute. The basic research question under investigation in this study focused on the extent to which pedagogical competencies learned during the training program are currently being utilized by apprenticeship instructors. Training evaluators have always had a problem evaluating the effectiveness of post training programs. Also, investigated was the ability to test a ex post facto assessment of a training program’s ability to test individual’s increased knowledge of instructional methods and their perception of education.

Questions were developed to test for specific pedagogical competencies that students learned during the summer apprenticeship instructors training institute.

Limitations

There are over 120 union sponsored apprenticeable skilled trades in America today. However, this study focused on the I.B.E.W apprenticeship program. Future studies must look at inter-locking networks of business and industrial training centers sponsored by industry and government. Those
centers will train workers to become proficient in their related skill for future personal and economic growth. Additionally a complete quantitative analysis to determine pedagogical competencies learned through training must be expanded beyond the IBEW in California.

Definitions
For the purpose of this study, the following definitions were used:

Apprenticeship: A voluntary training program through which individuals acquire trade and craft skill and knowledge (Rice & Spetz, 1982)

I.B.E.W: International Brotherhood of Electrical Workers. (Rice & Spetz, 1982)

American Federation of Labor and Congress of Industrial Organizations (AFL-CIO): An association of autonomous national unions financed primarily by the dues of union members. (Young, 1982)

Occupational Analysis: Study of an occupation to determine the need for skilled persons to perform that occupation and to acquire the skills and knowledge necessary to achieve skill mastery in that occupation. Rice et al (1982)
Wagner Act: An act developed in 1935 which strengthened the unions’ rights to organize and bargain with employers. (AFL Labor and Education Reports, Washington, DC, 1940)


Module: An instructional unit developed by the National Center of Research Education. A performance-based teacher education learning package. (The National Center for Research in Vocational Education, 1983)

EVOC 501 - Principles and Methods for Teaching Designated Subjects: (California State University, San Bernardino, Catalog, 1992)

EVOC 518 - Field Work in Designated Subjects: (California State University, San Bernardino, Catalog, 1992)

Journeyman: One who has served an apprenticeship in the electrical trade and is a qualified worker in another’s employ. A competent but undistinguished worker. (N.E.C.A./I.B.E.W., Instructors Guide, 1992)

Electrical Training Trust: A state-of-the-art training facility for apprentices and journeymen electricians that is sponsored by the International Brotherhood of Electrical Workers (IBEW) Local Union 11 and the National Electrical
Contractors Association (NECA), Los Angeles County Chapter. The trust provides the highest quality of electrical training available in the building industry. Programs include an intensive four-year apprenticeship program for men and women training to be union electricians, as well as continuing education classes to keep supervision and electrical workers abreast of new technologies and the advancements of the industry (Personal communication with Martin Hunt, Director).

Pedagogical competencies: "The non-technical skills needed to teach apprentices, such as those involved with presenting information, developing instructional activities, planning instruction, and managing learning activity". (Rice, Spetz, Hughes, Drewes, & Nerden, 1982, p. 7).

Vocational Education: "Organized education programs which are directly related to the preparation of individuals for paid or unpaid employment or an additional preparation for a career requiring other than a baccalaureate or advanced degree". (Vocational Education Section, Title II, of the Education Amendments of 1976, p.1. 94-482, p.24).
Organized Labor and Vocational Education

For more than a century and a half, organized labor's relationship with vocational education has been one of wholehearted support and encouragement. The labor movement in the United States has never slipped in paying close attention to educational problems. The American Federation of Labor (AFL) established resolutions calling for compulsory education laws as well as laws against child labor. Gompers (1912) expressed his concern over the damnable system which permits young and innocent children to have their lives worked out of them in factories, mills, workshops, and stores. This was appalling and noted as one of the worst labor's grievances. Ironically, this is still a problem in labor today. As we look around the country, we see the move toward exploited labor practices against young people, particularly in areas heavily populated by immigrants.

By the late 19th Century, some earlier unions such as Bricklayers, Pressmen, and Typographers established their own vocational schools. Successful and well organized, they laid the ground work for industrial education throughout the
labor movement. By the early 1900s, AFL committees on education were regularly reporting to the AFL convention the status of vocational education. The 1907 AFL convention, for example, recognized the formation of the National Society for the Promotion of Industrial Education. The Industrial Education Committee (1912) reported the strong support of the AFL to the National Society and endorsed its objective, raising the standard of industrial education and teaching higher techniques of our various industries.

From the beginning, organized labor saw the new vocational education program as much more than a way to teach workers to be more efficient. During the 1920s, at the AFL Committee on Education, Matthew Woll, President of the Photo-engravers Union and a member of the AFL Committee, commented, "We want education to continue to establish a habit of mind that is creative where we find expression in every relation in life... Vocational education should make the whole work process educational in character." (Woll, 1923, p. 93)

In the 1930s, organized labor strongly advocated the use of vocational training and retraining with the hope that vocational education could make a contribution toward relieving the problems of unemployment. Once again, Woll (1932) asked for a joint effort permitting the experience of
industrialists, labor, and executives to enrich and direct the course of vocational education.

Although there were apprenticeship programs developed by unions in the 19th Century, the first national apprenticeship program was not established until the passage of the Fitzgerald Act of 1937. In 1939, the labor movement and the U.S. Office of Education jointly promoted the International Labor Organization’s recommendations for apprenticeship programs. Recommendations made included, written definitions of apprenticeship, specific periods of time for apprenticeship in each trade, wages to be paid during an apprenticeship program, provision for related instruction, and joint employer-employee committee approval. (Beyer, 1940, p. 22)

Through the years, labor had strongly supported apprenticeship programs that included cooperative relationship between the schools, employers, unions, and equipment manufacturers. The courses were expected to be up to date, and the instructors were to be experts in their trade. Bey (1940) spoke of union involvement in apprenticeship programs leading to labor support for journeyman retraining courses, such as those developed at the Washburne Trade School in Chicago.

The AFL, Guide for Vocational Education (1938) described the rationale for vocational education and its
importance to youth, the economy, and the welfare of the nation. It was also critical of proposals to compromise quality in vocational education program and to produce a large number of low-skilled workers. The AFL implored affiliates to get involved in vocational education programs on the local level. The success of vocational education was seen as a joint responsibility, with the support of trade and industrial education by labor as an essential part of that joint responsibility.

At every convention, the AFL reaffirmed its faith in vocational education. It continuously called for the highest standards for a lifetime of learning. At the 1949 convention, the AFL approved an Executive Council report to the delegates that stated, in part, the following: "Vocational training, formal and informal, must help establish standards for work proficiency as well as equip the worker for his work. Education must be continuous. Adult education is as essential in our complex society as is elementary education or any other level of education." (AFL, Report of the Executive Council on Education, 68th Convention, 1949, P.24).

American Vocational Association (AVA)

American Vocational Association (1954) recognized the value of improving linkages with other organizations in
order to solve problems that were becoming widespread within the vocational education system. Membership for the committee was selected from states with good relationships with both management and labor. The creation of AVA's Labor-Management Relations Committee was still another indication of the dependence of vocational education upon its relationships with labor and management.

The labor movement had continuously looked for ways to expand its relationship with vocational education. In 1962, the International Brotherhood of Electrical Workers (IBEW) and the U. S. Office of Education announced a joint training agreement to improve training in the electrical trades. Prior to this agreement, the U. S. Office of Education had appointed a panel of consultants on vocational education to make a national study of the electrical field. During the same year that the IBEW announced its joint training agreement, the AFL-CIO Committee on Education presented its views to the panel in a paper called "The Changing Needs of Vocational Education." (Shields, 1962)

This paper reviewed labor's support for vocational education over the years. It also identified some major problems that vocational education needed to solve in the next decade. Problems included "better training for entry-level jobs in a rapidly changing economy, teaching new skills to workers whose jobs were eliminated due to
technological innovation, improving training for teachers, and keeping up with technical progress." (Shields, 1962, p. 1-4). By 1968, however, the AFL-CIO Executive Council had agreed with the National Advisory Council on Vocational Education that the "promise of the Act has not been realized." (AFL-CIO, 1968, p. 190). The Executive Council urged increased funding for vocational education programs, and in 1968 when the Vocational Education Amendment was passed, the amendment provided funds for the disadvantaged, consumer education of the poor, innovative programs, new curricula testing, and new testing methods. More meaningful responsibilities were given to the national and state advisory councils. The AFL-CIO hailed the legislation as a "landmark in the history of vocational legislation. However, the AFL-CIO was concerned over then-President Richard Nixon's withholding funds authorized by the 1968 amendments." (AFL-CIO, 1969, p. 56).

Education Amendment of 1976

Through the next two presidential administrations, battles were constantly being fought by the AFL-CIO in an attempt to eliminate categorical funding and to lump vocational education funds into block grants that would have provided significantly reduced funding. During the Carter administration the Education Amendments of 1976 were passed
and supported by the AFL-CIO. The AFL-CIO assessed the result of the struggle for adequate education funding during the Nixon-Ford years. Organized labor urged President Carter to address the needs of vocational education students working with out-of-date equipment, the tracking of such students, and the inadequate funding for vocational programs. They urged appropriations at the fully authorized level and full implementation of language concerning the role of the advisory committees. The AFL-CIO had steadily called for a substantial leadership program on the federal level to enable the nation’s public education system to educate and retrain America’s current and future work force. Organized labor had strongly supported current efforts to authorize the Vocational Education Act at higher appropriation levels in order to provide better education and training related to job opportunities. "Furthermore, Congress had been asked to provide the means to enable vocational education to train students to use high-tech equipment to provide new initiatives for the retraining of adults to provide support for the training, retention, and upgrading of teachers, and to continue to strengthen the requirements for labor representation on local advisory councils." (AFL-CIO, 1983, p. 190)
Organized Labor and the Classroom

In spite of the clear and pressing need for vocational education students to learn about collective bargaining and the contributions of unions, the actual classroom experience of such students can be described as one in which transmission of such vital knowledge is more the exception than the rule. Meany stated, "Organized labor is a part of the very fabric of our society, and it ought to be an important part of any serious attempt to understand that society. In most schools today, this has not happened." (Meany, 1980, p.1)

The distorted view of our economy and of American society in the schools is aggravated by the flood of materials sent to teachers. Leading corporations and other management-oriented organizations, such as the U. S. Chamber of Commerce and the National Association of Manufacturers, lean on the virtues of free enterprise, which treats labor either in a negative manner or not at all. Some states such as Maine and New York City, are making strides in developing materials about labor. There is a conscious effort "to balance the labor and management perspectives and to provide opportunities to explain and express the point of view of business, the employer, and management, as well as dissent on labor union and labor issues." (Riehl, 1983, p. X).
No vocational education program could be complete without exposing students to organized labor’s important role in shaping the world of careers. Hardly a city in America now exists without some form of organized labor. Labor’s involvement in vocational education flows from its fundamental support of public education which is basic to a democratic society. Organized labor’s efforts established today’s public school system. Underlying its support of the public vocational education, labor’s concern for quality workmanship and training through apprenticeships or other training systems is evident.

The majority of students in our public schools are children of working men and women, and organized labor wants these students to get the best that is available. Concern for the children and the nation had led union members to serve on hundreds of school boards and advisory councils throughout the nation. Local and state labor bodies have worked tirelessly to win better financial support for the schools. Labor representatives helped to establish standards and training schedules for apprenticeship programs. Union representatives contributed to the body of knowledge and research concerning vocational education, helped to plan career conferences, served on national commissions, and developed programs for dislocated workers. The value of organized labor’s linkage with vocational
Vocational Education in Apprenticeship

Apprenticeship is a unique, voluntary training system through which individuals acquire trade and craft skills and knowledge. Training combined daily on-the-job instruction in manipulative skills with periodic classroom instruction in technical subjects related to work requirements. Since apprentices are full-time employees of the company in which they are apprenticed, the system included a pay schedule for apprentices while they train. The system also required a formal written agreement between the apprentice and the program sponsor which set forth expectations, duties, and obligations of each party for the term of the apprenticeship. Along with the personnel preliminaries of pay schedule and overtime regulations, a time schedule for training in different aspects of the occupation is also included.

For centuries, apprenticeship had been a preferred method of training. Thousands of workers have been trained to perform effectively in highly skilled and technical occupations to the advantage of both the individuals and the sponsors. According to Rice (1982), the apprentice received several advantages such as gaining varied skills through
instruction and experience in all major aspects of his trade; learned to work in harmony with different types of trades and crafts people in a work setting; learned to work within a company or work organization; learned about each skilled worker’s part in the productivity plan of the industry or business; received a wage with regular increases while learning a skilled craft or trade; increased employability and economic security and received recognition as skilled workers from peers, journeymen, employers and union members.

There are over 700 apprenticeable trades or crafts including a machinist, die maker and electrician. Apprenticeable occupations are defined as those trades which skills are primarily learned through a combination of on-the-job training supplemented by related technical instruction requiring at least 2,000 hours of work experience plus related instruction, involve manual, mechanical or technical skills and is practiced industry-wide as a recognizable trade or craft; and involved the development of a body of skills sufficiently well defined to be applicable throughout an industry. These skills usually do not involve selling, managerial, clerical or professional activities.

To be selected for an apprentice position, applicants must be able to physically perform the work of the craft or
trade; must meet minimum age requirements; and usually must convince the program sponsor by test, interview, and records that, as apprentices, they will profit from the training experience. For most trades and crafts, applicants must be high school graduates or must have earned high school equivalency certificates. The program sponsors plan, administer, and pay for the program. Sponsors can be individual employers, groups of employers, or combinations of employers and unions.

The sponsor sets policy concerning the conduct of the program. Jurisdiction included selecting and indenturing apprentices, supervising training, establishing training curriculum, and certifying apprentices as journeymen upon completion of the program.

A variety of relationships denote the association between the apprenticeship system and vocational education to include evaluation and assessment services; associate degree programs; pre-apprenticeship experiences; curriculum development projects; instructor training and certification; related instruction courses; and advisory and planning board participation. The most frequently used associations are those in which vocational education provided related instruction or advisory board participation. The most infrequently used associations are those in which vocational education provided assessment and evaluation services or
associate degree programs. In each instance, vocational education provides a prescribed service to an individual or organizational apprenticeship client.

A viable, but infrequently used, service provided by vocational education to apprenticeship training is evaluation and assessment at either the program or individual level. "A notable exception is Oregon where the State Department of Education had developed and administered a program assessment instrument in all education associated related instruction settings. Using the instrument, a researcher established empirical ratings about the efficacy of various aspects of related instruction including public relations, planning, record keeping, enrollment procedures, training methods, and so forth. The resulting information is used to plan and revise programs in order to ensure currency and efficiency." (Edwards, 1983, p. 12) A second type of assessment provided by vocational education is occupational analysis. Colorado State Board of Community Colleges and Occupational Education and Colorado State University have produced occupational analyses for a number of trades. "Each analysis occupation outlined duties and tasks for entry level workers and provided a summary rating for importance of each task, as determined by a sample of industry representatives. Materials also included suggestions about how to use the information in the
instructional setting, as well as several sets of performance objectives to aid in program planning." (Barnes, Lewis, 1980, p. 45)

Individual assessment and evaluation services are provided by vocational educators in several states. Services involve qualifying and selecting the program, giving credit for prior experience, allowing advancement during term of apprenticeship, and offering guidance and counselling. "The majority of standards allocate 20 to 25 percent of the total qualifying points to formal education and educational certification." (Rice, 1981, p.12). In several instances, the standard for Instructional Union of Electrical Workers, for example, assigned points not only for education, but also for specific participation in relevant shop and vocational education experiences. (U.S. Department of Labor, 1976).

Another area of assessment and evaluation, providing counseling and career information, is a service offered by personnel to many public schools in cooperation with local apprenticeship sponsors. In California, local schools are charged with providing apprenticeship information and counseling through the auspices of the career guidance office. "Such information not only encourages participation and interest in apprenticeship, but also provides a direct
service to indentured apprentices." (California Vocational Education Planning Committee, 1989, p. 33)

The idea of combining apprenticeship training and college study had emerged during the past decade from experimental study to accepted practice. The programs involved apprentices not only in related instruction, but also in a variety of other formal educational experiences that resulted in the award of an associate degree or credit toward an associate degree at the conclusion of the apprenticeship period.

Recently, a new program has emerged called the pre-apprenticeship program. It is a service arrangement where the time of the student-trainee is divided equally between formal schooling and work. Not only have pre-apprenticeship programs been a successful training model for serving typical students, but they also have proven effective as a means of bringing special target groups of students into apprenticeship.

Curriculum development is one type of association between vocational education and apprenticeship and training. Typical projects ranged from production of related instruction materials to production of curriculum for entire training projects. "The Utah State Board for Vocational Education, in conjunction with qualified tradesmen and industry representatives, has developed a set
of materials for instructors to use as texts for related subjects." (Utah Vocational Education Planning Committe, 1989). The Plumbing Guide offered a four year course of materials dealing with subjects ranging from related mathematics to plumbing codes. The guide provided lesson-by-lesson directions for the instructor. It laid out the purpose of each lesson, required resource materials, and specific information points to emphasize. Each set of materials came in four parts -- a general outline for the curriculum; the instructor's guide; the study guide; and unit tests and final examination.

A very extensive set of occupational specific curriculum materials for related instruction training had been prepared by the California State Department of Education. Originally developed at the request of industry, the materials were written in conjunction with union and industry representatives and were made available for a multitude of trades. (California State Department of Education, 1990, pp. 23-56).

The most frequently used service provided by vocational education to apprenticeships is related instruction. Related instruction is the classroom portion of apprenticeship and is critical to the efficacy of the overall training. Related instruction as part of apprenticeship training is provided in the rules and
regulations of the National Apprenticeship Act. The standards required that a minimum of 144 hours a year of apprenticeship training be provided to each trainee in related subjects. This period can be increased and some industries require as much as 200 to 300 hours yearly in related subjects by apprentices. The subjects taught included theory, principles, and technical knowledge needed for the job; information to assist the apprentices to better accept and discharge their responsibilities; and occasional manipulative skills that are important to the craft or trade but are not provided conveniently in the apprentice's on-the-job training. This is an important part of an apprenticeship training system and is necessary in order to earn journeyman certification.

**Instructor Training and Certification**

Training and certification of apprenticeship instructors is an important element in vocational education. Certification is prescribed by law in a number of states, such as Wisconsin, Kentucky, Washington and Massachusetts. The credentialing process is the focus of several state-wide training programs in states, such as Maine, California, Indiana and Pennsylvania and several institutions, such as Purdue, Pennsylvania State University, and Ohio State University.
State Department's of Education frequently set certification requirements and give credit for both experience in the trade and formal education coursework. In Massachusetts, for example, the Department of Education regulations set forth minimum qualifications for instructor selection in order to ensure that apprenticeship instructors have minimal basic teaching competencies and trade experience. Specifications required that instructors have a high school diploma, necessary knowledge and skills of practicing journeyman, and two additional years of trade experience. Instructors in evening trade programs have even more stringent requirements. "To qualify, instructors must have a license to teach a trade with preference for a college degree, specified periods of work experience, and acceptable scores on performance tests. While adult vocational instructors are not required to hold a certificate, they must meet the provisions of the state plan for vocational education." (American Federation of Labor, 1983, pp. 155-156)

In California, the Ryan Act required that part-time related instructors working in state secondary industrial education systems be approved for the Designated Subjects Teaching Credential (DS). "The DS required an apprentice instructor to possess qualifying experience, such as completion of his or her own indentured apprenticeship in
combination with a minimum of two additional years of work experience. In addition, each instructor must complete a 60 hour Techniques of Teaching Course offered by the Division of Vocational Education in cooperation with the California State Department of Education. The course is offered at locations throughout the state and meet in the evenings or on Saturdays, once a week for 20 weeks. Full-time instructors have more stringent requirements. They must demonstrate occupational proficiency by successful completion of a battery of written and manipulative tests. In addition, they must complete a 9-semester unit personalized in-service training program and meet minimum citizenship requirements." (California Vocational Education Planning Committee, 1990)

Formal training programs designed to meet certification and selection requirements are available in all states that require such certification. Until recently, most certification and/or qualifying programs were available only through university-based, degree granting options. There are now more innovative, field based options. For example, the University of Maine and the Maine Department of Education and Cultural Services sponsor training programs for related subjects instructors. Based on an assessment of need for teaching skills, a set of individualized training materials have been adapted specifically for the target
population of instructors. Content is delivered through field-based institutes, workshops, correspondence study, and formal class work, depending on location throughout the state. The results indicated an improvement in the pedagogical skills of new instructors.

Institutional programs are geared more toward training than certification of related training instructors. For example, Purdue University trained approximately 1,000 instructors a year from the United Association of Plumbers and Pipefitters during an annual summer program. Now in its twenty-ninth year, "the program is a five-year, 200-hour training effort that results in certification as an instructor of journeymen and apprentices. Each annual workshop combined equal 20-hour parts of course work designed to upgrade technical trade skills in subjects like electricity, steam technology, code/standards, and materials with course work designed to improve pedagogical practice in related instruction." (National Center for Research, 1984, p. 2)

Vocational Education in California

California, with a population of over 26 million people and constant changing demographic patterns, continuously grows. "People enter the state at a rate of 400,000 per year." (California State Department of Education, 1989)
Forecasters expect California to reach an epidemic level of 32 million by the year 2000. This population growth and its accompanying social and cultural diversity had an impact on the demands for career-vocational education at all levels.

California’s large immigration rates and great cultural diversity is due to a natural linkage with Pacific nations of Latin America and Asian countries. Fifteen percent of California’s population were born in other countries, and not all aliens were accurately counted. There are an estimated two million undocumented immigrants, most of whom reside in Southern California.

With such demographics, it was necessary to develop a plan that expressed state needs and priorities as opposed to just a response to federal mandates. The mission of career-vocational education in California was to enhance the personal and economic well being of individuals and to develop human resources which contributed to the economic development of the state. (1989) The premise of the mission was to provide a continuum of career-vocational programs and support services responsive to equity, changing demographic patterns, changing needs, advances in technology, working conditions and skill requirements of employment.

To accomplish this mission, career vocational education must establish and strengthen partnerships with employers, labor, government, and other appropriate public and private
agencies to ensure that students are prepared to seek and obtain work, hold employment, advance in their chosen careers, and adjust to changing labor market demands.

Emphasis on educational reform had been placed on the mastery of core academic competencies by all students. The continuing need for a literate, well-trained, and flexible work force strengthened the interdependent relationship between academic and career vocational programs and levels of education, as well as placed increase emphasis on life-long learning and career upgrading opportunities.

The factors that have effected and will continue to effect career vocational education have been grouped into six broad categories: a change in technology; economic and occupational trends; a change in demographic patterns; changed social values and patterns; student attrition; and educational reform. (California Plan for Education, 1990, P.5).

Career-vocational education faced significant challenges. The past vocational education focus of providing only "job specific skills," which began in 1917 with the passage of the Smith-Hughes Act, had been replaced by a newer structure of broader educational experiences. Today, career vocational education must be dynamic and responsive to continuing changes in technology, occupational
trends, demographics, and social values. "At the same time, the new focus for the reform of career-vocational education must include cooperative planning between academic/liberal arts and career-vocational education personnel, effective linkages between business, industry, labor and education; a shift to an instructional focus that recognizes the need for increased academic and critical thinking skills; equity and excellence for the growing population of students at risk of school failure, and reduction of the school dropout rate."

(California Plan for Career-Vocational Education, 1990, P.61). Today, career vocational education programs must be sufficiently comprehensive in scope and content to maximize an individual's ability to adapt to constantly changing technologies and labor market needs. At all levels, education must emphasize the dignity of work and the worthiness of all occupations.

**Apprenticeship Training and Standards**

Recently, a study performed in Florida (Worthington, 1981) concluded that the requirement for the completion of an apprenticeship training program should be based on competence, rather than the period of participation in the program. If providers of apprenticeship training programs are to be able to follow this recommendation and to effect other changes in the structure of apprenticeship training
programs that have become necessary as a result of recent technological, demographic, and economic changes, then a strong collaborative partnership must be maintained between the vocational education and private sectors.

In 1982, Florida established the Job Training Partnership Act joining with Private Industry Councils. The council consisted of "the Division of Vocational, Adult, and Community Education; the Florida Council on Vocational Education; the Florida Education and Industry coalition; the Florida High technology and Industry Council; the Industry Services Training Program and Advisory Council; the Job Training Partnership Act; and the Trust Fund for Post-secondary cooperation. (National Center for Research, 1987)

As a result of the study, the Council made the following changes in vocational education: "(1) strengthened the industrial representation component on the Regional coordinating Councils (2) strengthened the involvement of labor and apprenticeship in vocational education and (3) increased regional coordination of vocational education and training activities and related organizations." (1987, p. 4)

In 1983, the Department of Education implemented several important projects in the areas of improvement of related instruction in apprenticeship training and improvement of linkages between vocational education and organized labor in the United States. Moreover, the new
federal legislation, the Carl D. Perkins Vocational Education Act of 1984, contained several provisions geared toward improving the linkages and collaboration between apprenticeship and vocational education.

Thomas (1983) identified the underlying dimensions of the barriers and facilitator to the linkage of vocational education and registered apprenticeship programs. It was anticipated that knowledge of the factors derived from barriers and facilitator would provide assistance in the development of models designed to establish collaborative arrangements between the two agencies. Participants included interviewees to identify potential barriers and facilitator to linkages and to act as respondents to the barriers and facilitator survey developed from interview results. A factor analysis identified five orthogonally rotated factors. The factors were apprenticeship selection process; inadequacies of vocational education as preparation for apprenticeship training; awareness of the functions of other agencies; communication within and between agencies; and deterrents created by the factors.

Planning the Apprenticeship Program

Apprenticeship programs, like many other human activities, are performed more effectively and efficiently when they are carried out according to a prescribed plan.
The utility of the plan is dependent upon the extent to which it is based on a sound and thorough understanding of the need for action and the alternative available choices. This information is provided by a technique called "occupational analysis," (Drewes, 1982). Occupational analysis is a study of an occupation to determine the need for skilled persons to perform that occupation and to have the skills, knowledge, and attitudes required to achieve skill mastery in that occupation. This is the first step in planning an apprenticeship program. However, before the analysis is accomplished, it must be determined if the occupation is an apprenticeable occupation.

After these determinations have been made, it is then necessary to decide what to teach. In order to come up with a primary task of planning instructions one needs to identify the knowledge, skills and attitudes necessary for successful job performance; decide on the appropriateness of the information for inclusion in related instruction; and fit the information into a content framework for the related subjects instructional experience.

Perhaps the most critical tasks in planning instruction is deciding and explaining what one is teaching. These tasks are critical because in apprenticeship, the goal is to help each apprentice eventually acquire all necessary knowledge and skills to perform his craft. The exact time
span will vary according to how quickly the trainer learns the characteristics of the trade. Instruction is often organized around individual strengths and limitations, and may use a variety of means to convey information. Individual records are maintained for each apprentice to include the amount of time spent on training. Outcomes of instruction are emphasized and expressed as objectives. Objectives indicate expected learning in performance terms. They explain exactly how the apprentices must behave or perform, how well they must perform, and under what conditions the performance must take place. These become the instructional goals for the class.

After the objectives are clearly defined, it is necessary to establish performance standards. These serve as reference points for judging performance of apprentices consisting of criteria and minimum level of success.

"For adults to learn effectively, they must develop a sense of ownership of the information and skills learned. They must be able to translate written materials into their own words and in ways that permit them to place themselves in roles in which the information under consideration is applied." (Rice, Spetz, 1982, p. 30) This means that the construction and use of examples and practice situations may be the most critical of all training tasks in related instruction.
Apprenticeship Instruction

Just as it is the duty of an apprentice instructor to provide related subject instruction, it is equally important to convey information in an instructional setting. One must be aware of the particular needs of the apprentices with whom one will be working in regard to their acquiring knowledge and skills and applying these knowledge and skill ideas to on-the-job experiences. In order to present the material in an effective manner, familiarity with the subject matter is crucial. One must be able to deal with both the "know how" and the "know why" in related subjects, while the apprentices' on-the-job instruction focuses on the "how to" in terms of specific job skills. (Nerden, Rice, 1982, P. 42) Poor directions lead to miscommunication or, worse yet, serious accidents. It is vital that information is presented in a clear, concise manner. Directions must be given, instruction provided and expectations explained as many times throughout an instruction or work activity. Certainly, it is a necessary task at the beginning of instruction with further clarification throughout the instructional period. Clear expectations are important because they set the stage for learning. What will be done and by whom, in what time frame and with what materials and to what end result must be clearly defined. This structure
allows apprentices to create individual internal learning strategies for addressing and mastering the materials.

Providing for Individual Needs of Apprentice

All people respond differently to training. Differences can come from various abilities, interests, and experiences of the trainee's life. An important part of the instructor's job is to identify these differences and design instruction so that training is effective for each apprentice. This identification process is called "assessment." (Spetz, 1982, p.23)

Assessment is an ongoing process; needs and interests change constantly. It is important to establish different methods to collect information from various sources about different characteristics of apprentices that may effect learning. With an effective assessment tool, an instructor is better equipped to provide a basis for making instructional decisions about placement of the trainee in a related instructional program, sequencing and pacing instructional activities, or identifying special supportive services. The greater the amount of information collected, the more complete is the picture of the apprentice, and the more satisfactory is the plan for the apprentice's training program.
Sources indicated that the first national apprenticeship program was established with the Fitzgerald Act of 1937 and by 1939 both the labor movement and the U. S. Office of Education jointly promoted International Labor Organization's recommendations for apprenticeship programs. These joint efforts basically established the criteria for the apprenticeship program as we know it today.

Further review revealed that although vocational education is an important part of American industry and unions a part of the American fabric, little is being done today to bring vocational education into the American schools.

The study indicated that these skills are primarily learned through on-the-job training supplemented by related technical instruction. It was also noted that many vocational education services such as evaluation and assessment are infrequently used.

Occupational analysis was another service offered by vocational educators. Business' duties and tasks were provided for entry level workers along with summary ratings for each task. Individual assessments are and evaluation services were available in several states but unfortunately are not available in every state.
Instruction was found to be the most frequently used service and was crucial to the efficacy of the overall training program. Instruction included theory, principles, technical knowledge and manipulative skills important to the craft or trade. This was done in conjunction with an apprentice's on-the-job training.

The review also indicated that a number of states were lacking in the certification of apprenticeship instructors while states mandating certification set certification requirements through the State Department's of Education. Formal training programs were available in all states requiring certification and through University programs. Many of these programs had innovative, field-based options available.

The Smith-Hughes Act of 1917 focused primarily on job specific skills and has been replaced by broader educational experiences. Vocational Education today must be dynamic and responsive to the continuing changes in technology, occupational trends, demographics and social values.
Chapter III
RESEARCH DESIGN AND PROCEDURES

Introduction

This chapter will discuss quantitative research design and related statistical concepts used to determine if pedagogical competencies taught during the I.B.E.W summer Apprenticeship Instructors Institute program were currently being applied in apprenticeship programs.

Methods and Procedures

The purpose of the study was to determine the extent to which pedagogical competencies taught during the I.B.E.W. summer Apprenticeship Instructors Institute program were currently being applied in existing apprenticeship programs. This chapter describes methods and procedures used to determine to what extent pedagogical competencies are currently being applied in the apprenticeship program.

Research Questions

A quantitative follow-up design was used to answer the following research questions:

1. To what extent were pedagogical competencies learned during the Summer Apprenticeship Instructors Institute currently being utilized by instructors in the classroom?
2. Did the Summer program change the apprenticeship instructor's perception of their educational role?

3. Have instructional skills improved as a result of the summer apprenticeship instructor training institute?

Population Sample (n=19)

One hundred National Association/International Brotherhood of Electrical Contractors attended the instructor training. A Likert questionnaire was developed and sent to (N=60) class participants:

A Likert scale is a series of graduations, levels, or values that describes various degrees of something. Scales are use extensively in questionnaires because they allow fairly accurate assessments of beliefs or options. A likert scale can be written in two forms, one in which the stem includes a value or direction, in which case the respondent indicates the degree of agreement; and one which the stem can be neutral, with the direction provided in the response options. (McMillan, 1989, p. 260)

One primary step in developing a Likert survey included a pilot study to test for content, clarity, and uniformity. This pilot instrument was used to test for extraneous variables that might influence the results or conclusions of the survey. The pilot study was conducted with a group of
25 Vocational Education Graduate Students at California State University San Bernardino. This sample survey was passed out and reviewed for conciseness, clarity, extraneous variables, content, understandability, and ease of use. The feedback from this pilot study helped to develop the final follow-up questionnaire. This questionnaire had face validity, trustworthiness, and reasonable answers to the research questions. (Appendix B - copy of research survey)

A sample size of \( N = 19 \) was selected from the population that provided sufficient data to answer the research questions. This sample size represents 31.7% of the total population.

**Related Procedures**

The survey questionnaire was developed as a joint effort between California State University (J. English, Coordinator of Graduate Studies, Personal Communication, March, 1993) and the California Statewide Joint Apprenticeship Training Committee (JATC) Instructor Training Institute (M. Hunt, Director of Training Trust, Personal Communication, March, 1993).

The purpose of the survey was to collect data regarding individual responses to 8 precise pedagogical competency categories taught during the I.B.E.W. summer Apprenticeship Instructors Institute program. This questionnaire along with
a standard quantitative research design was used to
determine to what degree pedagogical competencies learned;
did the program change the instructor's perception of their
educational role; and have instructional skills improved
during the Summer Apprenticeship Instructors Institute.

Questionnaire

Questionnaires and letters of endorsement (Appendix A)
were sent to Mr. Marty Hunt, Electrical Training Trust, Los
Angeles, CA., for distribution. For the convenience of the
respondents, the package had a self-addressed, stamped
envelope to return the completed questionnaires. (Appendices
A, B for copy of the questionnaire and the cover letter)

Analysis of the Data

(Research Question 1)
Quantitative research data were compiled using a Likert
questionnaire. Data were analyzed to determine to what
extent competencies learned during the Summer Apprenticeship
Instructors Institute are currently being utilized by
instructors. The statistical analysis was done by two
computer programs, Number Cruncher Statistical System and
Spread Sheet Analysis. Graphic support was also used to
execute this project. A frequency distribution was utilized
to indicate the most and least frequently occurring scores.
Measurement of central tendency, mean score (arithmetical average of all the scores), measurement of variability, and standard deviations (the distance on the average of the scores from the mean) were also calculated. This information was essential to describe a homogeneous set of scores. A mean analysis ranking was conducted to verify module use in comparison to frequency of use. Means and standard deviations were compared to reveal the extent of the difference between range of scores and mean scores as well as the variations in range of scores. (see Table 4)

An interview was conducted with Mr. Marty Hunt at the Electrical Training Trust, Los Angeles, CA, to answer the following questions:

(Research Question 2)

Did the Summer program change the apprenticeship instructor’s perception of their educational role?

(Research Question 3)

Are performance objectives and instructional methods improved from the skills learned in the summer apprenticeship instructor training?

Demographic information was collected using the survey instrument. The statistical information was obtained regarding the following variables: years in the apprenticeship program; years in specialty; years in the trade; years of education; and degrees obtained.
In order to collect evaluative information, questions were developed from modular material covered during the institute. The modules were produced by the National Center for Research in Vocational Education, at Ohio State University.

The following modules were used:

EVOC 501 - Principles and Methods for Teaching Designated Subjects
N-1 Prepare to Work With Adult Learners
N-4 Plan Instruction for Adults
B-2 Develop Student Performance Objectives
B-3 Develop a Unit of Instruction
B-4 Develop a lesson Plan
B-6 Evaluate the Performance of Adults

EVOC 518 - Field Work in Designated Subjects
C-10 Introduce a Lesson
C-11 Summarize a Lesson
C-13 Employ Reinforcement Techniques
C-16 Demonstrate a Manipulative Skill
C-17 Demonstrate a Concept Principal
D-6 Evaluate Instructional Effectiveness

Answers to the survey questions were ranked according to the questionnaire. For example, survey question one was ranked (A1), meaning (A) Prepare to Work With Adult Learners and (1) Can you now determine the needs and interest of
adult learners? A complete list of questions and their corresponding rankings can be found in Figure 2.

Models and Theory

A graph was developed to show the interrelated constructs and propositions that specify relations among variables in the survey. This overlay graph shows the observed relationship between the mean and standard deviation for each survey question.

Summary

The theoretical framework in chapter III served as a basis for the studies for procedural design. Chapter IV will provide the reader with an overview of statistical findings and quantitative ex-post facto results.
CHAPTER IV
FINDINGS AND DISCUSSION

Introduction

Information was collected regarding demographic variables, module categories, specific competencies, and other outcome variables that were defined during the summer Apprenticeship Instructor's Institute.

Demographic Variables

Demographic information was collected from all participants and data collected in three major categories. The participant's data were divided into years of teaching the apprenticeship program, years in the trade, and years of education. Table 1 shows that the mean for years in the apprenticeship program was 7.833 with maximum years in the program being 19. Other data indicated that the mean score for total years in the trade was 19.8 (see Table 1). Forty years of experience was the highest number of years spent in the trade (see Table 1).
Table 1 Demographic Information

Descriptive status showing distribution of demographic data for each survey question.

<table>
<thead>
<tr>
<th>DEMOGRAPHICS</th>
<th>MEAN</th>
<th>MIN</th>
<th>MAX</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years in Teaching the Apprenticeship Program</td>
<td>7.833</td>
<td>2</td>
<td>19</td>
<td>4.646</td>
</tr>
<tr>
<td>Years in the Trade</td>
<td>19.842</td>
<td>5</td>
<td>40</td>
<td>9.604</td>
</tr>
<tr>
<td>Years of Education</td>
<td>14.211</td>
<td>8</td>
<td>18</td>
<td>2.419</td>
</tr>
<tr>
<td>Degrees Obtained 0 = none 1 = Associates 2 = Bachelors</td>
<td>1.316</td>
<td>0</td>
<td>4</td>
<td>1.453</td>
</tr>
<tr>
<td>3 = Bachelors plus second credential 4 = Masters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Category Analysis

Mean ranking and statistical analysis were used to determine to what extent pedagogical competencies were learned during the Summer Apprenticeship Instructors Institute; and, are these currently being utilized by instructors in the classroom today. Measurements used in the primary analysis included the mean, mode, median, variance, standard deviation, standard error.

Keller & Warrack (1991) agreed that the mean is the best measure of central location for purposes of statistical inference, while the mode is the set of measurements that occur the most. Survey questions were assigned alpha numeric ranking for purpose of quantitative analysis (see Table 2). Out of 5 categories that were analyzed, category (G) Summarizing a Lesson, with question (QG4) (Do you now encourage to ask questions and comments to determine whether students understood the lesson?) was mostly used today. Category F, Prepare Teacher made Instructional Materials, question (QF1) (Do you now involve students in the planning and preparation of materials) was determined to be least used. All categories showed excellent utilization in the classroom today. Data for all categories appear in Table 3.
Table 2 List of Survey Questions
Survey questions Assigned Numbered Ranking for Quantitative Analysis

<table>
<thead>
<tr>
<th>Survey Questions</th>
<th>Assigned Numbered Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGOR Q A: Prepare to Work With Adult Learners</td>
<td></td>
</tr>
<tr>
<td>QA1 - Can you now determine the needs and interest of adult learners?</td>
<td></td>
</tr>
<tr>
<td>QA2 - Can you now determine learning characteristics and preferences of adult learning?</td>
<td></td>
</tr>
<tr>
<td>QA3 - Can you now determine the differences between andragogical and pedagogical positions?</td>
<td></td>
</tr>
<tr>
<td>CATEGOR B: PLAN INSTRUCTION FOR ADULTS</td>
<td></td>
</tr>
<tr>
<td>QB1 - Can you now provide a variety of instructional methods and activities?</td>
<td></td>
</tr>
<tr>
<td>QB2 - Do you use essential tasks/topics in planning instruction for adults?</td>
<td></td>
</tr>
<tr>
<td>QB3 - Do you determine student’s expectations for the course?</td>
<td></td>
</tr>
<tr>
<td>QB4 - Do you now develop at least one lesson plan covering a specific section . . .?</td>
<td></td>
</tr>
<tr>
<td>CATEGOR C: DEVELOP STUDENT PERFORMANCE OBJECTIVES</td>
<td></td>
</tr>
<tr>
<td>QC1 - Do you now develop psychomotor objectives that meet the following criteria (A thru C)?</td>
<td></td>
</tr>
<tr>
<td>QC2 - Do you now develop cognitive objectives that meet the following criteria (A thru C)?</td>
<td></td>
</tr>
<tr>
<td>QC3 - Do you now develop effective objectives that meet the following criteria (A thru C)?</td>
<td></td>
</tr>
<tr>
<td>CATEGOR D: DEVELOP A UNIT OF INSTRUCTION</td>
<td></td>
</tr>
<tr>
<td>QD1 - Do you now make sure objectives are stated in terms of student behaviors and performances?</td>
<td></td>
</tr>
<tr>
<td>QD2 - Do you now make sure evaluation procedures specified in the unit plan are directly based on the objectives?</td>
<td></td>
</tr>
<tr>
<td>QD3 - Do you now involve students in the formative and refinement stages of the planning process?</td>
<td></td>
</tr>
<tr>
<td>QD4 - Do you now provide for individual differences in student abilities and occupational goals?</td>
<td></td>
</tr>
</tbody>
</table>
(Table 2 continued)

**CATEGORY E: DEVELOP A LESSON PLAN**

QE1 - Do you now make sure students are given an opportunity to apply what they learn?

QE2 - Are you now developing lesson plans that include methods . . . to help students achieve the lesson objective?

QE3 - Do your lesson plans now contain information or techniques meant to pull loose ends together?

QE4 - Do your lesson plans now contain resources and evaluation methods?

**CATEGORY F: PREPARE TEACHER-MADE INSTRUCTIONAL MATERIALS**

QF1 - Do you now involve students in the planning and preparation of materials?

QF2 - Do you now provide concrete experiences . . . and motivate students with teacher-made instructional materials?

QF3 - Do your instructional materials now meet the following conditions (A thru C)?

**CATEGORY G: SUMMARIZE A LESSON**

QG1 - Do you now ensure that the important points covered in the lesson were condensed into a brief summary?

QG2 - Do you now indicate the relationship between the lesson and future lessons?

QG3 - Do you now use students' answers and comments to determine whether students understood the lesson?

QG4 - Do you now encourage students to ask questions, make comments, or express ideas during the lesson summary?

**CATEGORY H: EMPLOY REINFORCEMENT TECHNIQUES**

QH1 - Do you now immediately reinforce positive behavior?

QH2 - Do you now use effectively a variety of verbal expressions to show approval and disapproval?

QH3 - Do you now use audio or videotape replays to strengthen content learning?

**CATEGORY I: EVALUATE YOUR INSTRUCTIONAL EFFECTIVENESS**

QI1 - Do you now determine if students' initial needs, interests, and abilities are satisfied so progress can be measured?

QI2 - Do you now evaluate student achievement?

J: DEMOGRAPHICS
<table>
<thead>
<tr>
<th>Job Title</th>
<th>1 = Instructor</th>
<th>2 = Industry Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years in the Apprenticeship Program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of Specialty/ Course work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = General Curriculum (Electronics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 = Specialization in Electronics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 = Other Specialty (non-Electronic)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years in the Trade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degrees Obtained</td>
<td>0 = none</td>
<td>1 = Associates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 = Bachelors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = Bachelors plus second credential</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 = Masters</td>
</tr>
</tbody>
</table>
Table 3 Summary Survey Questions
Summary listing of all survey questions with the mean, standard deviation, minimum and maximum listed

<table>
<thead>
<tr>
<th>SUMMARY</th>
<th>MEAN</th>
<th>STANDARD DEVIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Prepare to Work With Adult Learners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>3.947</td>
<td>0.223</td>
</tr>
<tr>
<td>A2</td>
<td>3.833</td>
<td>0.500</td>
</tr>
<tr>
<td>A3</td>
<td>3.667</td>
<td>0.596</td>
</tr>
<tr>
<td>B: PLAN INSTRUCTION FOR ADULTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>4.111</td>
<td>0.657</td>
</tr>
<tr>
<td>B2</td>
<td>3.941</td>
<td>0.539</td>
</tr>
<tr>
<td>B3</td>
<td>3.816</td>
<td>0.590</td>
</tr>
<tr>
<td>B4</td>
<td>3.789</td>
<td>0.694</td>
</tr>
<tr>
<td>C: DEVELOP STUDENT PERFORMANCE OBJECTIVES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>3.526</td>
<td>0.752</td>
</tr>
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<td>C2</td>
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I: EVALUATE YOUR INSTRUCTIONAL EFFECTIVENESS

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### SUMMARY RANKING

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Question Analysis

The data analysis provided information concerning the extent to which performance outcomes and instructional methods improved as a result of the skills learned in the summer institute. From the data analysis, it was ascertained that all categories showed improvement because of skills learned during the summer program. The categories identified as most important were:

(QG4) Do you now encourage students to ask questions, make comments, or express ideas during the lesson summary?
(QG3) Do you now use students’ answers and comments to determine whether students understood the lesson?
(QG1) Do you now ensure that the important points covered in the lesson were condensed into a brief summary?
(QH1) Do you now immediately reinforce positive behavior?
(QG2) Do you now indicate the relationship between the lesson and future lesson?
(QB1) Can you now provide a variety of instructional methods and activities?
(QD2) Do you now make sure evaluation procedures specified in the unit plan are directly based on the objectives?
(QI2) Do you now evaluate student achievement?
(QF3) Do your instructional materials now meet the following conditions (A thru C)
(QH3) Do you now use audio or videotape replays to strengthen content learning?
(QA1) Can you now determine the needs and interest of adult learners?
(QE2) Are you now developing lesson plans that include methods ... to help students achieve the lesson objectives?
Categories identified least important were:
(QF1) Do you now involve students in the planning and preparation of materials?
(QD3) Do you now involve students in the formative and refinement stages of the planning process?
(QD4) Do you now provide for individual differences in student studies and occupational goals?
It was interesting to note that question (QF1) was scored the lowest.
To further emphasize the closeness of the population, an overlay graph was developed to show the relationship between the mean and the standard deviation (see Figure 1). Another graph was developed to show the mean and standard deviation ranking by survey question (see Figure 2).

Discussion
Overall, the summer Apprenticeship Training Institute was a great success. All information gathered during the data analysis reflects a high use of pedagogical
competencies in the classroom and individual’s instructional skills greatly improved. The overlay graph showed the relationship between the mean and the standard deviation and demonstrated a very low variance in answers to the survey questions. Statistical techniques and data analysis were used to answer each research question and provided appropriate results.
Figure 1  Overlay graph showing the relationship between mean and standard deviation

A: PREPARE TO WORK WITH ADULT LEARNERS
B: PLAN INSTRUCTION FOR ADULTS
C: DEVELOP STUDENT PERFORMANCE OBJECTIVES
D: DEVELOP A UNIT OF INSTRUCTION
E: DEVELOP A LESSON PLAN
F: PREPARE TEACHER-MADE INSTRUCTIONAL MATERIALS
G: SUMMARIZE A LESSON
H: EMPLOY REINFORCEMENT TECHNIQUES
I: EVALUATE YOUR INSTRUCTIONAL EFFECTIVENESS
Figure 2  Mean and Standard Deviation of each competency by degree of use
Chapter V
CONCLUSIONS AND RECOMMENDATIONS

Introduction

America's higher education has a weakness when it comes to preparing people for the work place. Thurow (1993) argued that too few workers including engineers and scientists are being produced relative to the rest of the world. America now produces fewer than half the PhD engineers and scientists per capita than it did in the early 1970s. The largest gap in the American educational system today is the lack of post secondary vocational education designed to train people for the high tech work place.

Organized labor in the United States has always been a strong advocate of training and educating its work force. A highly skilled force must be developed to stay competitive in today's global market place. American firms systematically invest less in the skills of their work force than their foreign competitors. For individuals that do not go on to college, a poor educational starting position is compounded by less on-the-job-training in a given profession.

The new technologies coming into the work place require everyone to have levels of math and technical competence that are far above those needed in the past. Union
apprenticeship programs are a strong line of defense in the war to develop a productive work force.

Conclusions

Based on the research questions and qualitative analysis, instructors who participated in the study changed their perception of their educational role, and have increased their pedagogical competencies through the summer institute. Many of these increased skills were utilized immediately in classroom instruction which in turn increased productivity. The summer program did change the apprenticeship instructor’s perception of their educational role by encouraging students to ask questions, make comments, or express ideas during the lesson summary. Many new concepts were obtained and were rated high by the participants.

The competency categories that were rated high included: (1) Summarize a Lesson (Category G); (2) Employ Reinforcement Techniques (Category H); (3) Evaluate Your Instructional Effectiveness (Category I); and (4) Plan Instruction For Adults (Category B).

These categories dealt with actual classroom instruction and were important because all of the participants were instructors prior to the institute. This may be the reason for the high scores and low variance.
The categories that were rated least important were:

1. Prepare Teacher-Made Instruction Materials (Category F);
2. Develop a Unit of Instruction (Category D).

These categories that scored as least important deal with the development of instructional materials. Unfortunately, most instructional material were developed at union headquarters. Each instructional center was directed to use basically the same educational material in order to produce similar educational outcomes.

The addition of these new pedagogical competencies will assist proficient instructor and enhance the apprenticeship program.

The N.E.C.A./I.B.E.W. Apprenticeship Instructors' Institute was a tremendous success. Apprenticeship instructors from California came together to share instructional experiences, educational challenges, and life experiences as instructors. They left with a better understanding of how to utilize their skills in classroom situations. All pedagogical competencies learned in the institute were currently being utilized in Apprentice Institute program. The quantitative ranking analysis revealed an extremely low variability in the data, one may conclude that agreement was high among the participants regarding the value of competencies learned during the summer institute.
Recommendations

As a result of the data obtained through this study, the following recommendations seem appropriate:

(1). Due to lack of investment in adequate vocational educational programs, the United States is becoming a third world labor force. It is imperative that organized labor and industry pickup the slack. Based on data from this study, if one is to increase pedagogical competency in instructional practices, one must have the proper vocational education. The I.B.E.W. institute taught important pedagogical competencies that continued to be utilized by participants.

(2). Additional studies will be necessary and must focus on other organized trades. This will allow for a better understanding of how the pedagogical competency of apprenticeable instructors affects quality of trade educators. Findings from this study must be combined with Nyerek's (1993) findings To Define The In-Service Pedagogical Needs of I.B.E.W. Apprenticeship Instructors.

(3). It is highly recommended that the instructional institute be continued and that a closer bond be established between California State University System and organized labor. A special center at the University should be
established to work with organized labor in developing new instructional training programs. Credentialing union instructors and continuing to insure that only the highest qualified personnel be allowed to instruct our "new recruits" will be the key to developing a quality U. S. workforce. Investing in the education of highly skilled instructors must be considered as an investment in America.

4. All data obtained from this study overwhelmingly points to continuing professional apprenticeship instructor programs. One must question how effective future instructional training programs will be due to a lack of leadership in professional Vocational Education in California. To insure continued professionalism in the presentation of pedagogical competencies, California must invest in its future and reinstate a PhD program in professional Vocational Education. Leaders produced through this program will have a better understanding of California's unique problems dealing with its work force and continue ensuring excellence in professional vocational education.
REFERENCES


American Federation of Labor, (1938), Guide for Vocational Education. Washington, DC: NESD.


American Federation of Labor. (1975, July 30). Statement to the Executive Council on Vocational Education. Chicago, IL: AFL-CIO.


American Vocational Association. (1958, April, 9), Minutes of the Executive Committee. in D. Shields (ed.), Organized Labor's Linkage with Vocational Education. (p. 4). Columbus, OH: The National Center for Research in Vocational Education.


Appendix A

Letter of Endorsement
James Cregg, Graduate Student, CSUSB

Summer Apprentice Instructional Program

IBEW Apprentice Teachers

I am a graduate student in the Vocational Education Administration Program at California State University, San Bernardino. I am currently doing research on the results of the Apprentice Instructional Program that was held at Cal State University, San Bernardino in July, 1992. Please complete the questionnaire form that is attached and return to Marty Hunt as soon as possible. Your response will help me gather the necessary statistics so that future programs will accomplish all that it was meant to.

The survey is designed to get feedback on how well you were able to return to your worksite and perform the competencies that were learned during the summer program.

When you have completed the survey, please send the questionnaire to Marty Hunt at the Electrical Training Trust, 515 S Ave 19, Los Angeles, CA 90031. Marty will then return the completed form to me. Once again, thank you for your expedient cooperation.

JAMES G. CREGG

MARTY HUNT

1 Atch: Questionnaire
Appendix B

IBEW Apprenticeship Instructor Survey
This questionnaire seeks input as to what extent the competencies learned during the institute are being utilized today. Please complete and return this survey as soon as possible. All responses will be kept strictly confidential. Thank you.

A. Name: ________________________________________

B. Your job title: ________________________________________

C. Number of years in the apprenticeship program: __________

D. What part of the curriculum in the apprenticeship program do you teach?

E. How many years in the trade? ________________________________________

F. How many years of education?  8 9 10 11 12 13 14 15 16

G. College degree held: Associates _____ Bachelors _____ Masters _____
Place a circle in the column that best reflects the degree to which you are currently using competencies you gained during the JATC instructor training institute. The competencies are listed below: Your choices range from 1 thru 5.

To what extent are you actually using the competencies you learned in the Summer Training Institute?

**Prepare to Work With Adult Learners:**

1. Can you now determine the needs and interest of adult learners.  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1

2. Can you now determine learning characteristics and preferences of adult learning.  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1

3. Can you now determine the differences between andragogical and pedagogical positions.  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1

**Plan Instruction for Adults:**

1. Can you now provide a variety of instructional methods and activities.  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1

2. Do you use essential tasks/topics in planning instruction for adults.  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1

3. Do you determine students' expectations for the course.  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1

4. Do you now develop at least one lesson plan covering a specific section, which includes, preliminary information, lesson approach (objectives and introduction), lesson development, and lesson summary.  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1

**Develop Student Performance Objectives:**

1. Do you now develop psychomotor objectives that meet the following criteria:  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1
   
   A. Performance is specified  
   B. Condition is specified  
   C. Criterion is specified

2. Do you now develop cognitive objectives that meet the following criteria:  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1
   
   A. Performance is stated in action terms  
   B. Criterion is specified  
   C. Criterion is realistic

3. Do you now develop affective objectives that meet the following criteria:  
   - **ALWAYS** 5  
   - MOST OF THE TIME 4  
   - SOMETIMES 3  
   - ALMOST NEVER 2  
   - NEVER 1
   
   A. Performance calls for attitudes  
   B. Condition is realistic  
   C. Feelings/attitudes call for realistic terms
Develop a Unit of Instruction:

1. Do you now make sure objectives are stated in terms of student behaviors and performances.
2. Do you now make sure evaluation procedures specified in the unit plan are directly based on the objectives.
3. Do you now involve students in the formative and refinement stage of the planning process.
4. Do you now provide for individual differences in student abilities and occupational goals.

Develop a Lesson Plan:

1. Do you now make sure students are given an opportunity to apply what they learn.
2. Are you now developing lesson plans that include methods, techniques, or learning experiences to help students achieve the lesson objective.
3. Do your lesson plans now contain information or techniques meant to pull loose ends together.
4. Do your lesson plans now contain resources and evaluation methods.

Prepare Teacher-Made Instructional Materials:

1. Do you now involve students in the planning and preparation of the materials.
2. Do you now provide concrete experiences, arouse interest, and motivate students with teacher made instructional materials.
3. Do your instructional materials now meet the following conditions.
   A. Clear
   B. Concise
   C. legible
   D. logical

Summarize a Lesson:

1. Do you now ensure that the important points covered in the lesson were condensed into a brief summary.
2. Do you now indicate the relationship between the lesson and future lessons.
3. Do you now use students' answers and comments to determine whether the students understood the lesson.
4. Do you now encourage students to ask questions, make comments, or express ideas during the lesson summary.
**Employ Reinforcement Techniques:**

1. Do you now immediately reinforce positive behavior. [5] 4 3 2 1
2. Do you now use effectively a variety of verbal expressions to show approval and disapproval. [5] 4 3 2 1
3. Do you now use audio or videotape replays to strengthen content learning. [5] 4 3 2 1

**Evaluate Your Instructional Effectiveness:**

1. Do you now determine if students’ initial needs, interests, and abilities are satisfied so progress could be measured. [5] 4 3 2 1
2. Do you now evaluate student achievement. [5] 4 3 2 1

Thank you for taking this survey. The answers will allow us to improve teacher training for future IBEW apprenticeship workshops. Please return the surveys to Marty Hunt in the Los Angeles office who will return them to me. If you have any questions do not hesitate to call. (James Cregg (909)-734-3542 or Dr. Joe English (909) 880-5638)