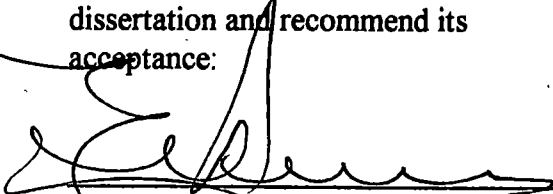
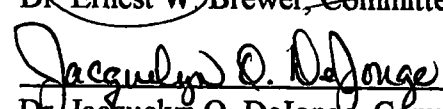
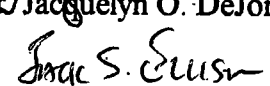


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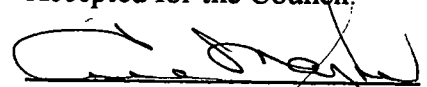
I am submitting herewith a dissertation written by Mark S. Farris entitled "Factors Affecting the Transfer of Related Training in a Trade Union Apprenticeship Program." I have examined the final paper copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Human Ecology.

  
\_\_\_\_\_  
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**FACTORS AFFECTING THE  
TRANSFER OF RELATED TRAINING IN A TRADE UNION  
APPRENTICESHIP PROGRAM**

A Dissertation  
Presented for the  
Doctor of Philosophy  
Degree

Mark S. Farris  
December 2001

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### Dedication

This dissertation is dedicated to my wonderful family and true friends who have always supported me both personally and professionally.

### Acknowledgments

In the fall of 1993, I made a life-changing decision to pursue a terminal degree at The University of Tennessee, Knoxville. I knew from the outset that this degree would not be an easy endeavor. In fact, I knew that it would be one of the most difficult undertakings thus far in my life, and it was! In the beginning I promised my committee that I would not only work hard, but would finish the degree if they would agree to accept me into the Human Resource Development doctoral program. Well, here I am eight long years later! I must point out that I could not have completed this degree without my faith in God and support from my professors, family, and friends.

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## ABSTRACT

The purpose of this study was to determine how five previously identified factors (Blair, 1996) related to the transfer of training among the national population of International Brotherhood of Electrical Workers apprentices. To accomplish the purpose of the study, certain independent variables were selected and studied that were believed to either inhibit or facilitate the efficacy of transfer of training.

To better understand the transfer process, it was necessary to investigate the perception of identified factors and the extent their contributions positively or negatively affected the transfer of training. A panel of experts and an extensive literature review were used to identify factors that affect the transfer of related classroom training.

Nineteen thousand one hundred and twenty three apprentices and journeymen out of 32,480 from a national five-year trade union apprenticeship program responded to the Transfer of Training Inventory. The TTI was designed to gather perceptions on 36 barriers/facilitators thought to affect the transfer of training and was categorized under the five factors identified as a result of an extensive review of literature.

The study utilized a one-shot case study design (Campbell & Stanley, 1966). A multi-variate test was used to determine if significant differences existed at the .05 level of significance. The researcher used an exploratory factor analysis procedure to determine if the factors and corresponding factor categories would be the same. The demographic variables used in this study were age, formal education, gender, marital status, military service, number of children, year in apprenticeship program, number of days lost during the past 12 months due to lack of work, time format of related classroom training.

The study found that significant differences existed in the perceptions of apprentices toward the factors affecting the transfer of related training in the majority of apprentices surveyed. Apprentices were classified as 1<sup>st</sup> year, 2<sup>nd</sup> year, 3<sup>rd</sup> year, 4<sup>th</sup> year or 5<sup>th</sup> year. Each group perceived the factors that affect the transfer of training differently. The study found that differences existed when apprentices were grouped by the demographic variables of age, formal education, gender, marital status, military service, number of children, year in apprenticeship program, work days lost in 12 months due to lack of work, and time format of related classroom training.

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## Chapter I

### Introduction

Organizations worldwide are undergoing major changes in structure, size, technology, and, most importantly, in human resources (Kirkpatrick, 1998; Phillips, 1997; Quinones, Ford, Sego, & Smith, 1993; Yelon & Sheppard, 1999). These changes, along with moving from an industrial age to an information age and from national to global competition require, an upgrade of worker skills (Swyt, 1995).

According to Meister (1994), employee skills, knowledge, and attitudes have changed over the past 20 years and will continue to change well into the next century. He wrote that, "three broad movements affecting industry: (a) flatter corporate hierarchies, (b) broader roles required of both workers and managers, and (c) a more culturally diverse labor force have combined to create a workplace unrecognizable from that which existed in the not so distant past" (p. vii). Human resource specialists will need to address these movements that are bringing changes in employee training and putting greater emphasis on the effectiveness of transfer of training (Foxon, 1997; Garavaglia, 1996; Phillips, 1997).

Workers and managers throughout American industry are increasingly faced with the reality of skill development. Skill upgrading is paramount to human resource development (HRD) managers. Proper employee development will facilitate corporate success (Aburdene & Naisbitt, 1990).

Meister (1994) reported that workers must make the necessary adjustments to maintain a competitive edge. These adjustments include (a) proper performance of the technical aspects of their jobs, (b) reaction to outside pressures, (c) meeting customer expectations, and (d) integration of new technologies. Rosow and Zager (1988)

concurrent, pointing out American industry's awareness of the need for increased job performance and the resulting increased expectations in classroom training. Goldstein and Gilliam (1990) agreed, suggesting improved job performance through technical skill development.

Corporate learning systems are becoming an essential part of dealing with technological change. The major concern facing trainers and HRD managers is transferring skills learned in the classroom to the workplace or work environment. This notion is often described as "transfer of training."

Transfer of training is defined as the linkage of attitudes, skills, and knowledge learned in the classroom to the job environment (Newstrom, 1984; Wexley & Latham, 1991). Other researchers (i.e., Kirkpatrick, 1998; Milheim, 1994; Redding, 1990; Yelon & Sheppard, 1999) expanded on this definition by describing training transfer as the accumulation of specific problem-solving skills that are transferable back to the job.

The ultimate purpose for having training programs in place is to increase job performance (Campbell, 1988; Druckman & Bjork, 1994; Wexley & Latham, 1991; Youker, 1985). According to Campbell (1988), transfer of training is a part of the phenomena of the classroom learning experience. Baldwin and Ford (1988) concurred by writing, "for transfer [of training] to have occurred, learned behavior must be generalized to the job context and maintained over a period of time" (p. 63). Kraiger, Ford, and Sales (1993) wrote that training transfer is facilitated by addressing such factors as the work environment and individual characteristics and their immediate effects on training outcomes. Clearly, the factors that inhibit or facilitate transfer of training and the

perceptions of trainees toward these factors are critical components to effective training and increased job performance. To better understand the transfer process, this study investigated the perception of identified factors by International Brotherhood of Electrical Workers (IBEW) apprentices and their contributions to the transfer of training in the apprenticeship program.

### Statement of the Problem

The problem addressed in this study was to determine how multiple factors affected the transfer of training of classroom instruction to on-the-job performance. Addressing this problem was important because, to the extent that it could be determined, there was a lack of information relative to the effect of multiple factors related to the transfer of training. Additionally, the limited information that was available was either contradictory, controversial, or anecdotal in nature.

### Purpose of the Study

The purpose of this study was to determine how five previously identified factors (Blair, 1996) related to the transfer of training among the national population of International Brotherhood of Electrical Workers apprentices. To accomplish the purpose of the study, certain independent variables were selected and studied that were believed to either inhibit or facilitate the efficacy of transfer of training.

### Rationale

The literature relating to the transfer of training revealed contradictory information regarding the factors that affect it most, including barriers/facilitators to the transfer process (Baldwin & Ford, 1988; Foxon, 1994, 1997; Huczynski & Lewis, 1980; Yelon &

Ford, 1998). Thus, these factors needed to be clearly identified and addressed.

Most studies have focused on the actual training experience rather than the transfer of trained tasks back to the job and task maintenance over time (Huczynski & Lewis, 1980). Noe (1986) concurred by writing, "the majority of applied work and academic research has focused on the appropriateness of various instructional methods, needs assessment, and evaluation of methodology" (p. 736). Researchers and practitioners have primarily focused their attention and effort on classroom training and have placed little attention on the transfer of skills back to the job.

A study conducted by the American Society for Training and Development (ASTD) (1996), using the Kirkpatrick (1998) model, found that 92% of trainers surveyed had evaluated training at level one. Additionally, the study found that only 30% of trainers measured learning at level two, and only 12.9% measured a change in post-training behavior (level 3) (p. 8). The ASTD study corresponded with Garavaglia's (1993) study which found that roughly 15% of evaluators in the United States measured a change in participants' behavior post-training. Thus, the problem of transfer needed to be addressed by this study.

Specifically, this study addressed the problem with the transfer process by finding out what factors and barriers/facilitators affect the transfer of related training. This was accomplished by gathering data regarding the perceptions of apprentices toward the transfer of related training.

#### Theoretical Framework Overview

Increasingly, organizations are experiencing problems because skills acquired in

classroom training are not being applied on the job (Ford & Weissbein, 1997). This is often referred to as a transfer of training problem. Foxon (1994) wrote that the phenomenon of transfer is a process in itself and why it occurs or does not occur is not altogether clear. Baldwin and Ford (1988) concurred, writing that researchers need to explore transfer from a progressive stand point in order to adequately explain how certain input variables under different contexts cause the occurrence of transfer. According to Yelon, Reznich, and Sleight (1997), "most researchers agree that transfer is the result of a complex interaction of variables" (p. 134).

Previous studies have provided research that was anecdotal in nature but lacked needed empirical evidence. This position was stated by Huczynski and Lewis (1980), who concluded that many transfer models presented have been worthy attempts at solving the transfer problem but have not been based on empirical evidence. Most research has concentrated on classroom training and has not addressed the transfer of newly learned skills back to the job (Goldstein, 1986).

Most recent researchers (Ford & Weissbein, 1997; Foxon, 1997; Machin & Fogarty, 1997; Yelon et al., 1997) have begun to provide empirical evidence relating to the transfer of training. According to Ford and Weissbein (1997), "a review of the studies [current transfer] examining training design shows that transfer studies are now using more complex tasks, more diverse samples, and using longer intervals between training and criterion assessment to demonstrate transfer" (p. 30).

According to Ford and Weissbein (1997), recent efforts relating to the study of the transfer of training have been centered around determining a greater understanding of the

organizational environment in which the individual is expected to transfer newly learned skills. In transfer research, there are two key situations or environments that a person works within: the training environment and the transfer environment. Recent researchers have begun singling out individual variables such as motivation and self-efficacy.

“Individual characteristics of the trainee and training design can impact knowledge and skill acquisition” (Ford & Weissbein, 1997, p. 36).

Empirically based transfer models have been proposed by researchers. Yelon et al., (1997) believed that current transfer models should “view transfer as a part of a continuous learning and motivational process extending to a learner’s past and projecting into a learner’s future” (p. 136). This model was based on four tenets: (a) the learner begins instruction with an array of memories, (b) the learner attaches functional significance to relevant tasks, (c) the learner becomes ready for application, and (d) the learner applies knowledge and learns from implementation. Machin and Fogarty (1997) proposed another transfer model called the Direct Effects Model that was based on empirical research. This model investigated the effects of seven variables on the transfer process. The seven tenets included in the model were: (a) self-efficacy, (b) motivation to transfer, (c) training reactions, (d) achievement of training goal, (e) goal for transfer of training, (f) commitment to transfer goal, and (g) situational constraints. Each tenet had a direct effect on the success of transfer.

Most contemporary transfer researchers (Blair, 1996; Ford & Weissbein, 1997; Foxon, 1997) agreed that the Baldwin and Ford (1988) Transfer Process Model continues to be one of the leading transfer models to date. This particular model was one of the first

to be based on empirical evidence and research that singles out the transfer environment (i.e., organizational environment, supervisory support, and peer support) as well as individual characteristics (i.e., motivation and self-efficacy). The theoretical framework and transfer models chosen to guide the course of this study are presented in detail in Chapter Two, Review of Related Literature.

### Hypotheses

The following null hypotheses were tested at the .05 level of significance.

According to Gay (1987), null hypotheses are recommended when the essence of the difference is known.

- H<sub>0</sub>1: There were no significant differences in the perceptions of apprentices toward the transfer factors and the factors identified by the review of literature.
- H<sub>0</sub>2: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of age.
- H<sub>0</sub>3: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of formal education.
- H<sub>0</sub>4: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of gender.
- H<sub>0</sub>5: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of marital status.
- H<sub>0</sub>6: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of military service.
- H<sub>0</sub>7: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of number of children they have.
- H<sub>0</sub>8: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of year in apprenticeship program.

H<sub>9</sub>: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of work days lost in twelve months.

H<sub>10</sub>: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of time format of related training.

### Assumptions

1. For purposes of this study, it was assumed that transfer of training was identifiable and was measurable.
2. For purposes of this study, it was assumed that the instrument designed to measure barriers/facilitators to the transfer of training had, at a minimum, content validity.
3. For purposes of this study, it was assumed that instructors, journeymen, supervisors, and training directors had no influence on apprentices' perceptions at the time the survey was taken.
4. For purposes of this study, it was assumed that the apprentices answered each item on the instrument honestly and to the best of their ability.
5. For purposes of this study, it was assumed that training directors disseminated survey instruments to all apprentices in their JATCs.

### Limitations

There were four primary limitations to this study:

1. The study was limited by the fact that there was no control over organizational structure of the transfer environment.
2. The study was limited by the fact that there was no control over supervisory and peer support.
3. The study was limited by the fact that there was no control over individual characteristics of apprentices, such as motivation and self-efficacy.
4. Data were used to evaluate the perceptions of barriers/facilitators and not performance standards achieved on the job.

### Delimitations

1. The study was delimited to nine independent variables that could impact the transfer of training.
2. The study was delimited to persons who were full-time IBEW apprentices during the spring and summer of 2000.
3. The study was delimited to using a one-shot case study design. Therefore, generalizing the results of this study to other similar populations should only be made with great caution.
4. The population for this study was delimited to full-time IBEW apprentices.
5. Data were collected only in the spring and summer of 2000.
6. Only 49 states were represented in the study.

### Definition of Terms

This study uses a number of terms and definitions that are specific to the field of Human Resource Development. The definitions below will provide clarification of the terms used in this study.

1. *Apprentice*: A person who has entered into an apprenticeship contract in order to learn a craft or trade. Usually a working age individual "with manual dexterity and other characteristics directly related to the apprenticeable occupation to be learned" (U. S. Department of Labor, 1982, p. 3).
2. *Apprenticeship*: "A written agreement, also known as an indenture, that imposes obligations on both the apprentice and employer and provides for a stated number of hours of reasonable continuous employment that offers an approved schedule of training and work experience, supplemented by related instruction. The agreement is registered with an apprenticeship and training council, chamber, government agency, and so forth" (Campbell, 2000, p. 227).
3. *Barriers to Transfer*: "The set of actual and perceived factors that inhibit the success of training and development efforts and act as impediments to the transfer of training" (Broad & Newstrom, 1992, p. 172).

4. *Baseline Data*: Data used to support an observation of demographic variables until stabilization of such data occurs.
5. *Construction Electrician*: Also known as an inside wireman. This highly skilled individual generally works on "new construction" projects but is qualified to perform maintenance and repair various electrical systems.
6. *Factors*: For the purposes of the study, the factors chosen that might affect the transfer of training were developed by Blair (1996).
7. *Factor Analysis*: "The creation of new variables (factors) through the clustering of large numbers of variables into smaller numbers of homogenous sets" (Nunnally, 1994, p. 111).
8. *International Brotherhood of Electrical Workers (IBEW)*: The International Brotherhood of Electrical Workers is the largest electrical union in the world and represents workers' rights in all areas of the electrical industry.
9. *Inside Wireman*: A highly skilled electrician working in the construction industry. The inside wireman installs conduit which will contain the electrical feeders that come from the substation and go to the switchgear inside buildings.
10. *Joint Apprenticeship Training Committee (JATC)*: A JATC is trade-specific territory established by geographic location. Each JATC is supervised by a training director and offers a classroom setting for related training.
11. *Locus of Control*: Individual perception that success or failure is based on personal initiative or lack thereof.
12. *Maintenance of Transfer*: The length of time skills, attitudes, and beliefs are used in the workplace.
13. *National Electrical Contractors Association (NECA)*: The management association for electrical contractors. NECA represents thousands of employers who guarantee their installations and perform quality work on time and on budget.
14. *National Joint Apprenticeship Training Committee (NJATC)*: A joint venture between the International Brotherhood of Electrical Workers and National Electrical Contractors Association which is responsible for related training. The NJATC develops and coordinates the national curriculum that ensures consistency and helps maintain standards.

15. *On-the-Job Training (OJT)*: "Workplace-based training setting in which trainees learn and demonstrate mastery of skill objectives through structured training normally conducted in the job environment" (Blair, 1996, p. 26).
16. *Peer*: As operationally defined for the purpose of this study, a peer is a person who is equal to another, in this case, a co-worker.
17. *Self-Efficacy*: The belief in one's capability to mobilize the cognitive resources, motivation, and courses of action needed to meet task demands (Bandura, 1986, p. 391).
18. *Supervisor*: A person in charge of subordinates or employees in a work setting.
19. *Task*: A unit of work that has a beginning and an end and is comprised of one or more elements.
20. *Theoretical Framework*: A model that designs the framework for the development of the instrument and a factually based structure.
21. *Trade Union Apprenticeship Program*: For the purposes of this study, a trade union apprenticeship program is defined as an apprenticeship program organized and implemented by the International Brotherhood of Electrical Workers during the year 2000.
22. *Training*: A planned learning experience designed to permanently change an individual's knowledge, skills, and attitudes. Additionally, training is designed to develop or improve an individual's on-the-job performance (Blair, 1996, p. 28).
23. *Transfer of Related Training*: For the purpose of this study, transfer of related training refers to all of the skills taught and/or acquired during an IBEW apprenticeship during the year 2000.
24. *Transfer of Training Inventory (TTI)*: An instrument designed by the researcher for the purpose of gathering data regarding apprentice perceptions of barriers/facilitators that affect the transfer of training.
25. *Wireman*: A widespread term used by the electrical industry to describe an electrician.
26. *Work Group*: A group of peers bound together by a department or unit.

### Summary of Organization of Study

The study was organized into five chapters. Chapter I is the Introduction and contains the statement of the problem, purpose of the study, rationale, theoretical framework overview, assumptions, limitations, delimitations, research questions, and definition of terms. Chapter II is the Review of Related Research and provides a detailed description of the transfer of related training, theoretical framework and transfer models used in the study, each of the five factors that affect the transfer of related training, and identification of barriers/facilitators. Additionally, Chapter II provides information about the importance of perception and apprenticeship training programs. Chapter III, Methods and Procedures, provides detailed information regarding the research design, population used in the study, independent variables, dependent variables, instrumentation, and data analysis. Chapter IV is the Analysis of Data and Results and contains the results of the statistical analysis of data. Each hypothesis is restated and followed by a description of the tables, which contain the results of the analysis. Last, Chapter V is the Summary, Findings, Conclusions, Recommendations, and Implications. This chapter provides a detailed summary of the study as well as the major findings. This chapter also discusses the conclusions that were drawn from the study, offers recommendations for future research, and gives the implications of the study.

## Chapter II

### Review of Related Literature and Research

Increasingly, companies are faced with reorganization, heightened competition, and the bottom line. This can be attributed to change from a localized economy to an economy that is primarily global in nature (Aburdene & Naisbitt, 1990; Gutteridge, Leibowitz, & Shore, 1993; Phillips, 1996; Wexley & Latham, 1991). "Training and development systems in North America must be strengthened if its human resources are to be prepared adequately for the future" (Wexley & Latham, p. xi). According to Gutteridge et al., the development of human resources has become a crucial business strategy.

Aburdene and Naisbitt concurred, writing, "In a global economic boom of the 1990s, human resources are the competitive edge for both companies and countries. In the global economic competition of the information economy, the quality and innovativeness of human resources will spell the difference" (p. 39).

Past researchers (Baldwin & Ford, 1988; Foxon, 1997; Gagne, 1962; Wexley, 1984; Yelon & Sheppard, 1999) agreed that the literature pertaining to training transfer had offered little to practitioners concerned with maximizing transfer. Baldwin and Ford concluded that the research on training transfer has been lacking due to its dynamic nature and the fact that most researchers have simply chosen to ignore it. Wexley and Baldwin (1986) revealed that the past literature on training transfer was less empirical and more conceptual in nature. Tannenbaum and Yukl (1992) concurred by writing that advances in actual factor identification have been made, but not in the area of theoretical development (i.e., empirical research).

More recent researchers (Foxon, 1995, 1997; Tracey, Tannenbaum, & Kavanaugh, 1995; Yelon & Sheppard, 1999) have developed models that "single-out" pre-learning and pre-training characteristics and trainee motivation. Existing empirical research has generally treated work-related factors as being fixed and not related to individual characteristics (i.e., motivation and self-efficacy). Past research generally revealed that independent individual characteristics were treated as being separate from transfer environment characteristics (Gist, Bavetta, & Stephens, 1990).

A review of the research revealed a need to produce studies addressing various work factors, research frameworks, and transfer barriers/facilitators relating to individual characteristics and their effect on the transfer process. More research is needed to ascertain whether a transfer problem exists and, if so, how to overcome it. Additionally, the results of this study will enable related instructors of information, workplace supervisors, and others to recognize factors that inhibit or facilitate the transfer of related training.

In recent years, human resource development professionals have been encouraged to evaluate their training programs for effectiveness. According to Dixon (1990), the notions of training transfer and return on investment have been the topic of various journal articles. In spite of this development, less than 25% of training groups worldwide evaluate their training for transfer and less than 10% for return on investment (Phillips, 1996).

Further investigation of the literature confirmed the increased importance being placed on training evaluation by Human Resource Development professionals (Kirkpatrick, 1998). According to Haskell (1995), transfer was important to organizations

seeking to stay abreast of social, technological, and global changes. Haskell went on to write, "Those individuals and organizations who develop transfer abilities will be the ones who will be able to best adapt, compete and survive" (p. 1).

Transfer of training is not always an easy undertaking. Even the most effective training can yield little in terms of measurable results. In many cases, trainees are inclined to go back to their jobs with no measurable change in behavior (Georgenson, 1982; Wexley & Baldwin, 1986; Wexley & Latham, 1991). This occurrence is often referred to as "transfer failure" (Clark, 1986). According to Clark, it occurs because knowledge and skills rarely transform into increased job performance without intervention. Clark concluded that the main objective of industrial training programs is increased job performance and thus should be the main focus of HRD professionals.

#### Importance of Transfer

Ellis (1965) described transfer as "[an] experience or performance on one task that influenced performance on some subsequent task" (p. 3). Ellis concluded that transfer occurred in stages (Ellis's citation is intended to show the different types of research that exist on transfer and is not the transfer that is specifically being researched in this study):

1. Performance on one task may aid or facilitate performance on a second task, which represents positive transfer.
2. Performance on one task may inhibit or disrupt performance on a second task, which represents negative transfer.
3. There may be no effect of one task on another, in which case we have an instance of zero transfer (p. 3).

According to Hatcher and Schriver (1991), the transfer literature thus far presented two areas of research: training transfer (knowledge, skills, and attitudes) and cognitive transfer (mental skills). Hatcher and Schriver concluded that past research focused primarily on cognitive transfer instead of transfer of training.

Joyce and Clift (1984) described transfer of learning as the effect of learning a particular skill on the ability to learn something different at another time, perhaps in the near future. They expanded on this notion by suggesting that transfer of learning thus far focused primarily on cognitive strategies. Joyce and Clift wrote that traditional industrial training programs were concerned with skill transfer from the classroom back to the job.

The literature supported the notion that transfer is affected by previous learning. Ellis (1965) wrote that previous learning had an effect on new learning starting at an early age. An example given by Ellis was of college students who reacted a certain way to a new course based on their experience in a previous course. He suggested that attitudes learned in one scenario may transfer to another. "It is difficult to think of any adult learning that could not be affected by earlier learning. We might, in fact, regard all studies of learning beyond a very early age as studies of transfer of learning" (p. 5).

Early researchers like Thorndike and Woodsworth (1901) were the first to define the components of transfer. They theorized that transfer consisted of at least two tasks with the same elements. It should be noted that the identical elements theory was based on transfer assumptions of the time which were quite different from modern transfer theory. Druckman and Bjork (1994) stated:

This position [identical elements] was in stark contrast to the long-standing view

that the condition of a person's mental faculties accounted for transfer. Thorndike and Woodsworth rejected the view that the mind was a muscle that must be strengthened with good exercises, such as study topics like Latin and geometry, and that with such rigorous studies, transfer between two fields would be straightforward.

According to Pond (1938), most early transfer research centered around such topics as Latin. Woodrow (1927) added that early transfer research also included exercises in memory training. Phillips (1997) theorized that training should be evaluated at five levels.

1. Reaction - Evaluation at this level addresses how participants feel about the training. The reaction of trainees can be directly related to customer satisfaction and program success.
2. Learning - Evaluation at this level determines if participants acquired the desired knowledge, skills, and/or attitudes identified in the training objectives. In order for the training program to be successful, attitudes must change, knowledge must increase, and skills must improve.
3. Behavior - Evaluation at this level addresses changes in participant behavior, which are dependent upon skills acquired through training. Support and encouragement from the organizational environment, supervisors, and peers are critical if the learned skills are to transfer back to the job. Level three evaluation is also affected by the participants' desire to change behaviors.
4. Results - Evaluation at this level is defined as the effect of learning on the organization. In addition, this level addresses the measurable results that transpired because the participants attended the training program.
5. ROI (Return on investment) - Evaluation at this level primarily focuses on program costs to the organization, profits, monetary benefits, and other factors related to improvement.

The Phillips (1997) model was appropriate to mention because if barriers to the transfer process are not reduced or eliminated, the training program is not to blame, thus, making evaluation at levels three, four, and five ineffective.

### Theoretical Framework and Transfer Models

Thorndike and Woodsworth (1901) theorized that motivation, response elements, and identical stimulus found both in the classroom and the workplace, if matched properly, maximized the probability of positive training transfer. McGehee and Thayer (1961) added to this theory by writing that transfer was found to be present in training programs that taught general rules and principles theory. Other researchers found that trained tasks practiced to a level of proficiency promoted positive transfer (Fitts, 1965; Schendel & Hagman, 1982).

According to Huczynski and Lewis (1980), "Many [transfer] models presented have been all-embracing, but rarely have been in any way supported by empirical evidence" (p. 239). Other researchers (Leifer & Newstrom, 1980; Michalak, 1981; Wexley & Baldwin, 1986) concluded that past research was lacking in that it failed to address transferring newly trained skills back to the job. Instead the focus was primarily around classroom skill development. Goldstein (1986) concurred by saying early transfer research addressed classroom training principles instead of skill maintenance once the workers returned to the job.

Contemporary researchers (Baldwin & Ford, 1988; Foxon, 1994, 1997; Yelon & Ford, 1998) have begun looking at training transfer in terms of individual variables such as (a) supervisor and peer support (Bahn, 1973; Campbell & Cheek, 1989; Chase, 1998; Marx, 1982; Tracey, et al., 1995), (b) motivation to transfer (Blair, 1996; Foxon, 1994), (c) organizational environment (Foxon, 1994, 1997; Lim, 1999; Stroul & Schuman, 1983; Youker, 1985), (d) motivation to learn (Baldwin, Magjuka & Loher, 1991; Machin &

Fogarty, 1997), and (e) self-efficacy (Bandura, 1986; Gist, Bavetta, & Stephens, 1990; Mathieu & Martineau, 1997; Tannenbaum, Mathieu, Sales, & Cannon-Bowers, 1991). This conceptualized framework approach specifically addressed the notion of transferring newly trained skills from the classroom directly to the job. Foxon (1995) expanded on the training transfer research by addressing plausible barriers/facilitators.

#### Baldwin and Ford Transfer Process Model

Baldwin and Ford (1988) based their transfer process model (see Figure 1) on existing empirical evidence. This model structures the transfer process into three broad categories: (a) training input, (b) training output, and (c) conditions of transfer.

According to Baldwin and Ford (1988), training input is grouped into three specific sections: (a) trainee characteristics, (b) training design and delivery, and (c) work environment. Training input factors were based on learning principles outlined by Bass and Vaughan (1966), and the job relevance of training content was based on the findings of Campbell (1971) and Ford and Worten (1984). The trainee characteristics section included ability, personality, and motivation. These are personal traits that are necessary to facilitate learning (Baldwin & Ford, 1988). The training design and delivery section included principles of learning, sequencing, and training content design and delivery. These subsections addressed notions specific to the actual training environment. The work environment section included support and opportunity to use. These subsections addressed outside support from supervisors and peers. Baldwin and Ford reported that the training output section includes both learning and retention. The learning takes

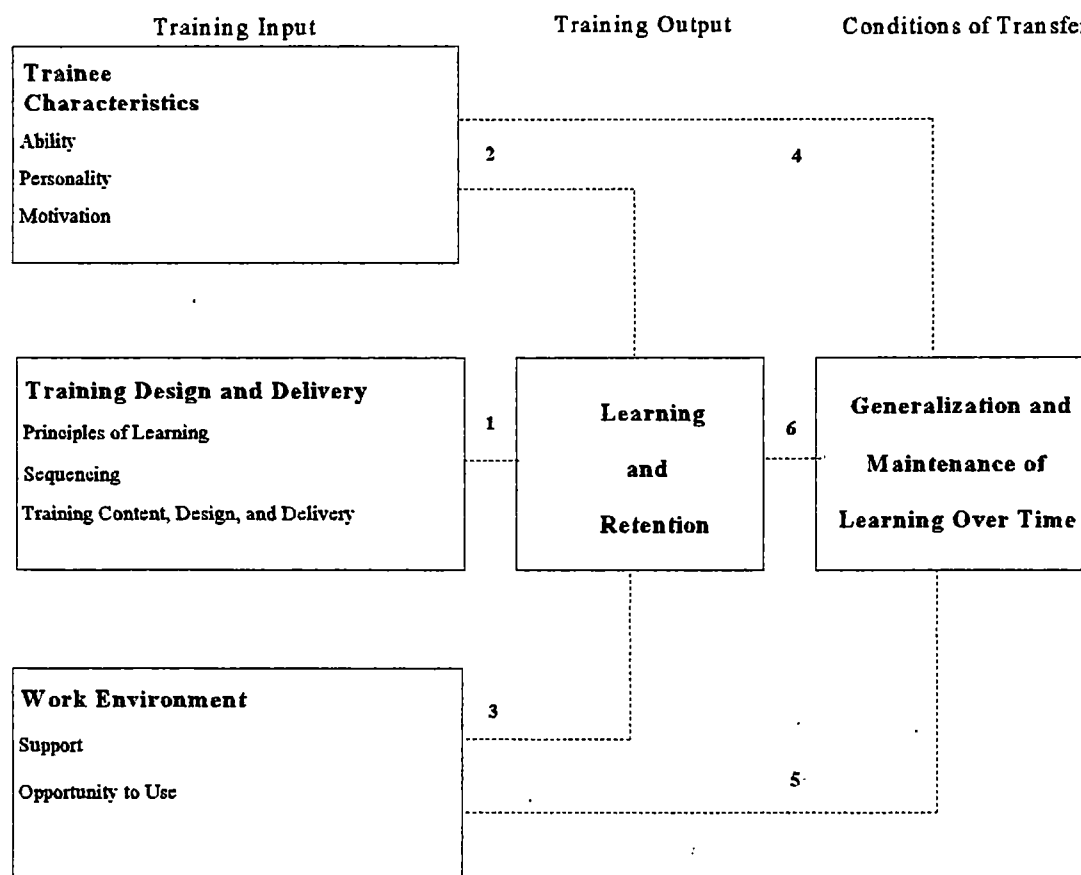


**Figure 1.** Baldwin and Ford transfer process model

**Note.** From "Transfer of Training: A Review and Directions for Future Research," by T. T. Baldwin and J. K. Ford, 1988, *Personnel Psychology*, 41, p. 65. Copyright 1988 by Personnel Psychology, Inc. Adapted with permission of the authors.

place during the actual training segment and includes the skills that will be ideally transferred back to the job. The retention will take place once the workers return to their jobs.

According to Baldwin and Ford (1988), the conditions of transfer are grouped into two specific sections: (a) generalization of training content back to the job, and (b) maintenance of learning over time. They surmised that the training goal was specific to the amount of learning and as a result would be retained over time by the worker.

The Baldwin and Ford (1988) model suggests a direct relationship between training input, training output, and the conditions of transfer. This relationship is represented in the form of six direct linkages shown in Figure 1 by dashed lines and numbers 1 through 6. According to Garavaglia (1996), the Baldwin and Ford (1988) Transfer Process Model set the stage for understanding key training transfer issues as well as providing a basis for additional research.

#### Hypothesized Blair/Foxon Initiation Stage Model

Two additions to Baldwin and Ford's (1988) training transfer process model were Foxon's (1994) Stages of Transfer Model and Blair's (1996) Opportunity to Perform Model. "Viewing transfer as a process rather than an outcome or product of training is the essence of Foxon's (1994) model" (Blair, 1996, p. 10). Garavaglia (1996) stated that the Foxon model is based primarily on force field analysis and looks at training transfer as being influenced by two types of factors: (a) inhibiting and (b) supporting. These two factors are an integral part of the transfer process.

Foxon's (1994) five-stage model viewed the transfer process starting with

intention to transfer and ending with unconscious maintenance. Initiation is used for the purpose of this study. Each stage in the process builds on the one prior to it. The model is designed to measure transfer at each stage. Transfer failure can occur at any stage within the model, but the highest risk of failure is in the initial levels (Garavaglia, 1996).

Garavaglia (1996) defined "initiation" as "any attempt by the trainee to apply what was learned in training to the job" (p. 6). Garavaglia wrote that the transfer training process can be discontinued or inhibited at any time due to various organizational reasons. Garavaglia added that "factors within the training environment, immediate work environment, and larger organizational environment affect motivation" (p. 6).

The hypothesized model used for the development of the TTI instrument is shown in Figure 2. The model is divided into two main categories: (a) transfer environment and (b) individual characteristics. These two categories are sub-divided into five parts: (a) organizational environment, (b) supervisory support, (c) peer support, (d) motivation, and (e) self-efficacy.

Transfer Environment. According to Baldwin and Ford (1988), the practitioner literature pertaining to transfer of training suggested that transfer was dependent on factors within the trainee's work environment, ideally favorable ones. Blair (1996) wrote that "research has shown that the environment could influence transfer both before the training course began and after it ended" (p. 46). Organizational environment was defined by Rouiller (1989) as "the type of support or constraint that trainees will be likely to encounter in their job situations, concerning their use of the training" (p. 4). According to

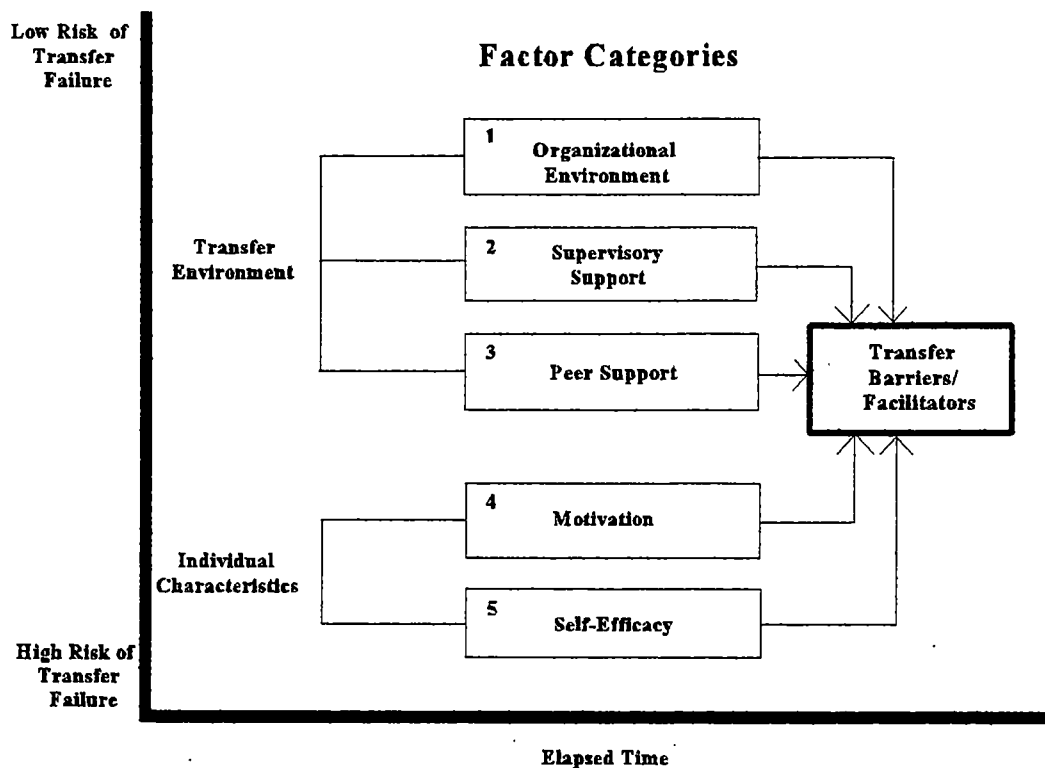


**Figure 2.** Hypothesized Blair/Foxon initiation stage model

**Note.** From "Factors Affecting the Transfer of Training Based on the Opportunity to Perform Trained Tasks," by D. A. Blair, 1996, Unpublished doctoral dissertation, University of Tennessee, Knoxville. Adapted with permission of the author.

Foxon (1995), "organizational climate plays a significant role in moderating the effectiveness of training" (p. 23). Blair (1996) concurred, writing that "in the training literature, a number of environmental factors have been proposed to affect transfer of training, including climate for transfer" (p. 12).

The second issue to address is supervisory support. A number of variables pertaining to post-training transfer are beyond the trainer's control (Blair, 1996). Blair wrote that "often those who can best help trainees apply the learning do not know how, do not agree with what is to be applied, or in some way inhibit, rather than promote, the application of training" (p. 50). Both the employee's supervisor and peer group can help promote the transfer of training. Peer support will be discussed next.

As stated earlier, the peer group can influence training transfer either positively or negatively. Baldwin and Ford (1988) reported that positive interaction between a trainee and the peer group can result in favorable transfer. According to Noe (1986), trainees that perceived a supportive work environment and peer group, characterized by quality interpersonal relationships and ample resources, were more likely to maintain learned skills over time.

Individual Characteristics. The literature suggested that individuals can adversely affect their own environment and transfer. Terborg (1981) reported that individuals have characteristics that affect certain situations. These characteristics include motivation, cognition, personality, and ability. Quinones et al. (1993) concurred, saying that individuals have the capability to influence the training transfer arena. For the purpose of this study, the individual characteristics of motivation and self-efficacy will be investigated.

Foxon (1995) wrote that "although relatively little attention has been given to motivational factors impacting training effectiveness, transfer appears to be as dependent on the inclination to apply the learning (motivation to transfer) as it is on post-training capability" (p. 21). According to Noe (1986), there is a distinct difference between motivation to learn and motivation to transfer. Motivation to learn is directly related to the classroom and under personal control. Motivation to transfer involves trainee confidence to apply learned skills through trust in ability, perception of training relevance to the job, and belief that the skills will improve job performance (Foxon, 1997; Keller, 1987; Mathieu & Martineau, 1997; Noe, 1986).

The second characteristic to investigate is self-efficacy (Bandura, 1986; Gist, Schwoerer, & Rosen, 1989; Machin & Fogarty, 1997). Bandura defined self-efficacy as one's belief that he or she has the capability to utilize cognitive resources, motivation, and courses of action to meet job demands effectively. Traditionally, workers with a higher sense of self-efficacy are shown to have higher transfer of newly learned skills (Noe, 1986).

#### Importance of Organizational Environment

Foxon (1994) indicated that both a favorable and unfavorable organizational environment can impact training transfer. The following unfavorable factors of organizational environment were cited: (a) no obvious application of training, (b) low motivation of intent to transfer, (c) perceived lack of supervisor support, and (d) an uncertainty about how to use the learned skills. Favorable examples listed were (a) ideal organizational environment, (b) relevance of training content, (c) motivation to use skills,

(d) transfer strategies internalized, (e) perceived supervisor support, and (f) potential applications identified. As written earlier, these factors can either inhibit or facilitate the transfer process.

According to Tannenbaum and Yukl (1992), the environment provided by the workplace can positively or negatively affect the transfer of related training. Eddy, Glad, and Wilkins (1967) concurred, writing that the employer determines whether or not the organizational environment is friendly or unfriendly to the transfer process. Richey (1992) reported that the workplace environment is equally important to the transfer of related training as the learning process itself. Tracey et al. (1995) found that there was in fact a direct relationship between transfer of skills and the organizational environment experienced by the newly trained worker. The study surveyed department managers who had attended training relating to the development of interpersonal skills. The researchers found that the better the match between the work environment and new learning, the higher the probability the newly learned skills would transfer.

"The training environment cannot replicate or incorporate the organizational system pressures and factors which influence trainees to revert to their former work habits and forget about the training applications" (Foxon, 1994, p. 3). Hendrickson (1990) and Long (1990) concurred with Foxon's viewpoint, writing that no matter how relevant, well-designed, or skill-based the training, there is a certain degree of artificiality about it. Usually the training environment fails to replicate that of the job. Oftentimes the trainer fails to compensate for this. Consequently, when workers return to the job, organizational pressures can override any intention to transfer what was learned in the classroom back to

the job (Foxon, 1994). In this particular case, organizational pressures include the desire by the worker to "catch up" after being away from the job. This desire to "catch up" usually takes precedence over thinking through new possible applications of the training (Broad & Newstrom, 1992). "The longer this delay between the learning and application, the less likely it is that the gap between training room theory and the work place practice will be bridged" (Foxon, 1994, p. 3). The proposed remedy according to Foxon is more trainer and supervisor involvement.

Mosel (1957) pioneered the idea of linking a lack of organizational support to transfer failure. Mosel added that training would only transfer in a favorable organizational climate that is directly related to supervisory and peer support.

#### Importance of Supervisory Support

Walton (1989) reported that "trainee intentions and initial efforts to achieve changes in their on-the-job behavior usually cannot prevail amidst a general lack of reinforcement and support from their bosses or the organizational culture" (p. 64).

Campbell and Cheek (1989) concurred, writing that "failure to transfer newly acquired behaviors is often caused by apathy and lack of involvement on the part of the supervisor" (p. 32). Noe (1986) hinted at the notion of negativity on the part of the supervisor. He noted that negative attitudes toward training in general had a significance on the outcome of transfer.

According to Campbell and Cheek (1989), the transfer of newly acquired behaviors is difficult at best without supervisory support. Walton (1989) found that trainees who require outside support usually have their initial motivation diminished by

non-supportive managers. Spitzer (1983) recommended that trainers "work with supervisors and managers to offer incentives that help employees perform tasks they learned in the training program" (p. 14).

According to Michalak (1981), skill maintenance is not a reality unless the manager attempts to maintain the behavior. Wexley and Baldwin (1986) added that supervisor involvement can be achieved by including him or her as a trainer or co-trainer.

Wexley and Latham (1991) believed supervisors influence transfer through both verbal and non-verbal cues. These cues can affect transfer before, during, and after training. An example given by Wexley and Latham was a supervisor rescheduling training or not allowing an employee to attend training because of a minor crisis resulting in a signal of indifference. On the other hand, a positive cue can affect transfer in a beneficial way. The example provided was supervisory support of transfer by giving trainees the opportunity to perform trained tasks.

Foxon (1994) also reported that supervisory support adversely affects training transfer. Richey (1992) and Rouiller (1989) concurred, writing that supervisory expectation that a skill be used and the support and encouragement that follows helps facilitate the training transfer, whereas negative expectations have the opposite effect.

According to Shoemaker (1998), "when supervisors provided an environment that nurtured the training process, they provided safety nets for employees that circumvented the possibility of non transfer" (p. 38). Broad and Newstrom (1992) wrote that supervisors were in a position to transfer or remove additional work from individuals, thereby providing individuals the necessary time to concentrate on transferring newly

learned skills.

### Importance of Peer Support

The literature consistently pointed to the notion of peer support as an important factor in the transfer process (Huczynski & Lewis, 1980; Marx, 1982; Wexley & Latham, 1991). Further review revealed surprisingly little empirical research explaining the impact of peer support as a mechanism of transfer. Baldwin and Ford (1988) reported that information gathered by practitioners regarding peer support was gathered too soon after the training program and was inadequate for developing a research base to better understand the transfer dilemma.

The non-empirical studies presented here documented the importance of peer support. According to Schneider (1983) there were significant differences in peer support within various organizations. Langer (1979) reported that the slightest hint of negativity within a work group could undermine the transfer of trained tasks. Evan (1963) suggested that a supportive peer group could help foster the self-efficacy needed to overcome job-related stress and a non-supportive group could have the opposite effect.

According to Baldwin and Ford (1988), positive reinforcement from a worker's peer group to attitudes, skills, and knowledge would result in improved job performance over time. Greeler and Herold (1975) reported that in many cases, learners responded more favorably to peers than to supervisors. Broad and Newstrom (1992) concurred, writing that learners supported by peers were more likely to transfer skills. Kram and Isabella (1985) reported that positive work group influence reinforced trained tasks over time.

Michalak (1981) reported that successful training involves skill acquisition and maintenance. Skill acquisition comes from many different formats including, but not limited to, the classroom, and maintenance comes once the trainee reports back to the job. "Maintenance of behavior is anything which keeps an acquired skill or knowledge up to a performance standard, i.e., getting feedback on the quality of one's work, and having the opportunity to use the skills" (p. 22). The idea of skill acquisition and maintenance can be nurtured through a supportive peer group.

Ford, Quinones, Sego, and Sorra (1992) reported that a trainee may feel more comfortable performing trained tasks in a supportive peer work group than in one that is non-supportive. Wexley and Latham (1991) concurred by pointing out that work group interaction, support, and reinforcement facilitate not only what is learned in the classroom but also what is transferred back to the job. Wexley and Latham added that "failure to provide such support can result in alienation during training and/or on the job" (p. 104).

Broad and Newstrom (1992) wrote that the unity created by a group of peers far outweighed anything that an individual could produce. The authors added that confidence and support came because the individuals knew they had a "back-up" in the peer support group, thus giving them confidence to transfer newly learned skills. Additionally, peers that successfully completed previous training and successfully transferred skills to the job were in a position to help individuals overcome difficulty with skill transfer.

According to Ford and Weissbein (1997), the notion of peer support was a critical part of the transfer of training process. Broad and Newstrom (1992) reported that individuals with shared training experiences were more likely to transfer newly learned

skills by keeping in contact with their peer groups. Broad and Newstrom added that a simple commitment by peers in the form of a promise to one another regarding skill usage would greatly increase the likelihood of skill transfer. Becker and Klimoski (1989) concurred, writing that individuals were more likely to respond favorably to peer groups that they were psychologically close to than those they were not. Therefore, feedback gathered from the supportive peer group would increase the likelihood of positive transfer.

### Importance of Motivation

Wexley and Latham (1991) reported that motivation has been one of the key tenets of facilitating the transfer of related training. "No one doubts the importance of motivation [to transfer] for facilitating the transfer of trained tasks to the job" (Wexley & Latham, p. 102). Machin and Fogarty (1997) concurred, writing that "trainee motivation is regarded as one of the key variables in the transfer process" (p. 100). Current research suggested that trainees entering training with a higher level of motivation learned better than those with a lower level (Baldwin, et al., 1991; Beirsner, Ryman, & Rahe, 1977; Heggstad & Kanfer, 2000; Machin & Fogarty, 1997; Mathieu, Tannenbaum, & Salas, 1990; Pintrich, 1999; Wolters & Rosenthal, 2000). Noe (1986) concurred, suggesting that trainees very committed to their work have a higher level of motivation to learn new skills during training class. "Maximum behavior change is likely to result when trainees have mastered the program content and are highly motivated to using newly acquired skills on the job" (p. 511). Noe added that this higher level of motivation could lead to improvement in job performance and the potential for skill mastery.

According to Annett and Sparrow (1985), trainers who have concentrated on the

motivational facet of learning have seen positive results with regard to the transfer of skills. A study conducted by Machin and Fogarty (1997) found that police officers who attended training programs were motivated to transfer newly learned skills due to the dangerous nature of the work. The researchers surveyed the officers at the beginning of the training, during training, and one week after training and found a direct linkage between motivation and the transfer of related training. Another study by Ryman and Biersner (1975) conducted on navy divers found a direct correlation between motivation to transfer and frequency of diving school graduation. The researchers learned that divers who dropped out of the school were less motivated and confident in their ability to dive and, conversely, those who stayed enrolled were more motivated.

Mathieu and Martineau (1997) stated that several studies (Annett & Sparrow, 1985; Baldwin et al., 1991; Hicks & Klimoski, 1987; Martocchio, 1992; Machin & Fogarty, 1997) have identified empirical linkages between trainees' pre-training motivation and the ability to learn. "Pre-training motivation may prepare trainees to learn by heightening their attention and increasing their receptivity to new ideas" (Mathieu & Martineau, p. 195). Mathieu and Martineau added that this results in the trainees being more "primed" to learn (p. 195).

Researchers (i.e., London & Bassman, 1989) showed a direct linkage between individual motivation to transfer and the organizational environment. According to London and Bassman, individuals respond to organizational events both positively and negatively. For example, individuals may respond positively to opportunities for advancement and, conversely, negatively to the lack of opportunities. "The organization

supports career motivation through supervisory behavior and human resource policies and programs providing rewards, opportunities, performance feedback, and organizational changes" (p. 334). The authors went on to say that individual self-confidence is likely when workers are rewarded by the organization for positive actions and decisions.

Locke (1976) was one of the first researchers to investigate the relationship between an individual's career and motivation to learn. He wrote that job satisfaction focuses on a two-fold value judgement: (a) the difference between what individuals actually want and what they perceive they actually receive and (b) the importance placed on what is really wanted (p. 1304). Moos (1973) concurred, writing that people behave in their respective work environments based on what they perceive and what they actually receive from the job.

According to London and Mone (1987) motivation is in place by the time individuals begin their career. London and Bassman (1989) reported that just because motivation is in place at the beginning of a career, it does not mean that it will remain constant and unchanged throughout the career of an individual. Work experiences can sometimes change an individual's motivation to learn. The authors added that the notion of self-confidence is an integral part of an individual's career motivation and can be positively influenced by decisions and actions.

Noe (1986) reported that individuals interested in job advancement are more likely motivated to learn new skills. He added that in addition to individual motivation, support from the transfer environment (i.e., supervisory support, peer support, etc.) helped facilitate individual motivation to learn. London and Bassman (1989) concurred, stating

that “enhancing an individual’s skills and knowledge is likely to build self-confidence and the desire to achieve” (p. 742).

Recent researchers (i.e., Heggstad & Kanfer, 2000; Wolters & Rosenthal, 2000) advanced the importance of motivation to learn and transfer. According to Heggstad and Kanfer, “individual differences in motivation have long been held to influence learning and performance” (p. 751). The authors added that it was of great benefit to distinguish between “individual differences in motivational traits and motivational skills” (p. 753). Motivational traits were defined as “stable, trans-situational individual differences in preferences related to approach and avoidance of goal-directed effort expenditures” (p. 753). In contrast, motivational skills were defined as “integrated, self-regulatory competencies engaged during goal striving” (p. 753). The authors argued that there was a relationship between individual differences and motivational skills and traits. Wolters & Rosenthal reported that there was a relationship between task importance and motivation. This suggested that learners were more motivated to transfer tasks thought to be of greater importance and, conversely, less likely to transfer less important tasks.

Research (i.e., London & Bassman, 1989; Mathieu & Martineau, 1997; Noe, 1986) on individual characteristics such as motivation has shown a relationship with the transfer of trained tasks. Thus, it should be viewed as an important piece of the transfer process.

### Importance of Self-Efficacy

Ultimately, the primary responsibility for achieving training transfer lies with the individual (Phillips, 1991). According to Phillips, “the participant must understand the

material, put it into practice, and have the confidence and reinforcement to use it on the job" (p. 312). The idea of the individual having the confidence to apply learned skills is called self-efficacy (Bandura, 1986). Bandura cited self-efficacy as "people's judgement of their capabilities to organize and execute courses of action required to attain designated types of performance" (p. 391).

Shoemaker (1998) reported that self-efficacy can be an integral part of learning and transfer before, during, and after the training experience. Broad and Newstrom (1992) concurred, writing that before learning, supervisors could promote self-efficacy in the minds of learners by promoting positive expectations and outcomes. It was believed that this would instill value in the training before the learners arrived in the classroom.

According to Bandura, Adams, and Beyer (1977), if learners do not believe in their own abilities, they might not attempt to apply newly learned skills. Shoemaker (1998) concurred, writing that "learners have had a need to believe that they were capable of performing new tasks" (p. 18). Although individuals may mean well, they are not capable of performing a training task unless they truly believe in their ability.

In a study by Bandura, Reese, and Adams (1982), there was a direct correlation between the degree of self-efficacy in learners and the effort put forth by learners regarding the application of newly learned skills. The authors went on to write that confident learners were able to overcome barriers/facilitators to transfer and eventually overcame fear of skill usage.

Self-efficacy can be promoted during training. A study by Machin and Fogarty (1997) measured five items related to strength of self-efficacy: (a) self-confidence in the

capability of learning new content, (b) self-confidence in the capability of performing well in training, (c) ability to use newly learned skills effectively, (d) self-confidence in the capacity to develop competence in using skills learned in the classroom, and (e) self-confidence in the ability to overcome potential transfer barriers/facilitators. The study found a direct correlation between self-confidence, performance, and positive self-efficacy.

There is a higher probability of individuals using newly learned skills that would normally be considered threatening, if they were allowed to do so in a non-threatening, safe environment (Bandura, 1977). When successes begin to outweigh failures, individuals begin to increase their self-confidence, thereby promoting positive transfer. Ford et al., (1992) concurred, writing that although supervisory support was critical to the success of positive transfer, favorable self-efficacy in many cases alleviated the need for continuous supervision.

According to Bandura (1977), learners who feared certain situations they deemed beyond their control often avoided them. The author went on to write that when learners were confident in their abilities, they were less intimidated and able to apply newly learned skills. This level of confidence can be achieved during training by providing a nurturing, supportive environment.

There is evidence that suggests that self-efficacy can be promoted post-training. Bandura (1977) reported that individuals with robust self-efficacy were able to reduce the impact of failure through repeated cases of success. In his study, individuals were able to overcome difficult obstacles, increase self-motivation, and ultimately reduce the number of failures through persistent effort. The organization is in the best position to provide the

needed post-training support. Additionally, supervisors can provide a "safe" environment in which individuals can apply newly learned skills (Ford et al., 1992).

According to Noe (1986), when individuals had confidence in their abilities, they were increasingly more likely to use newly learned skills and, therefore, were able to transfer them back to the job. Bandura (1977) wrote that self-efficacy was constant and, therefore, could be continued until failures were minimized.

Recent research on self-efficacy has shown its importance in shaping the behavior of trainees within the organizational setting (Decker, 1999; Gist & Mitchell, 1992; Machin & Fogarty, 1997; Mathieu & Martineau, 1997; Shoemaker, 1998). According to Machin and Fogarty, there is a direct relationship between self-efficacy and the outcome of training. Machin and Fogarty reported that "higher self-efficacy contributes to better performance by reinforcing the individual's judgement that better performance is possible through a greater commitment to self-set performance goals" (p. 101). Gist et al., (1989) concurred, writing that self-efficacy can be a predictor in the outcome of industrial training programs. Furthermore, research has shown significant correlations between self-efficacy levels and post-training transfer (Mathieu, Martineau, & Tannenbaum, 1993).

According to Gist, Stevens, and Bavetta (1991), individual perceptions of self-efficacy arise from personal experiences, performance strategies, and encouragement (i.e., from supervisors, peers, etc.) which can alter perceived task demands. Blair (1996) concurred, stating that "self-efficacy represents a dynamic [changeable] and comprehensive judgement reflecting a variety of personal and task-related performance determinants" (p. 70).

### Identification of Barriers/Facilitators

Previous research by Foxon (1995) revealed 127 barriers/facilitators (see Appendix A, page 169) thought to inhibit or facilitate the transfer of related classroom training.

Using previous research produced by Foxon and an extensive independent review of the literature, the researcher confirmed each barrier/facilitator identified by Foxon. A series of books and journal articles were reviewed to determine if additional barriers/facilitators to the transfer of related training existed. As each book and article was read, the researcher identified barriers/facilitators and typed them verbatim into a list. The list was then compared to the original list produced by Foxon. The independent review of literature confirmed that the list of barriers/facilitators identified by Foxon was accurate and complete.

Content analysis, a data analysis technique used to find commonalities in data, was performed on the list of 127 barriers/facilitators. Each barrier/facilitator was written in the form of a statement. Using highlighters, the researcher colored-coded each barrier/facilitator and placed it under one of the five factors. The researcher determined that relationships existed between the list of barriers/facilitators and each of the five factors, then submitted them to the panel of experts for verification.

### Panel of Experts

Appendix B, page 174 contains a list of the panel of experts who were chosen based on (a) their publications on related topics, (b) years of related work experience, and (c) their agreement to participate. The subsequent steps utilized by the panel of experts are listed below.

1. Each barrier/facilitator was re-written in the form of a statement. The panel of experts was asked to review the list of 127 barriers/facilitators and confirm their accuracy. Additionally, the experts were asked to add any barriers/facilitators that they thought affected the transfer of related training. They were also asked to delete any barriers/facilitators from the list that they deemed to be a duplication or unnecessary.
2. The panel changed and adapted the titles of factors to better reflect the list of barriers/facilitators. The panel also reduced the original list of 127 barriers/facilitators to 36. Many redundancies and duplications were eliminated. Additionally, the panel moved several barriers/facilitators to factors that seemingly had better associations. Table 1 contains a list of the 36 barriers/facilitators used to develop the pilot instrument.

### Importance of Perception

Ivancevich and Matteson (1987) defined perception as follows:

... the cognitive process by which an individual gives meaning to the environment because each person gives his or her own meanings to stimuli, different individuals will 'see' the same thing in different ways. The way an employee sees the situation often has much greater meaning for understanding behavior than does the situation itself. (p. 58)

Thus, organizations need to address employee perceptions because employees may act as if those perceptions are reality, regardless of whether they are.

A study by Tziner and Falbe (1993) demonstrated the relationship between perception and the application of skills learned through training. Seventy-three employees were studied in order to gather information regarding trainee perceptions of the degree to which the workplace would be supportive of skill transfer. "They found that perceived work environment support and its interaction with seniority accounted for a significant portion of explained variance of motivation to transfer skills and of reaction to the training program" (Ripley, 1998, p. 19).

Table 1

**Transfer of Training Inventory Barriers/Facilitators**

| Barrier/Facilitator                                                                 | Source                                                                 |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 1. I prefer the variety of work construction offers.                                | Baldwin et al., 1991; Foxon, 1995; Noe, 1986; Wexley & Latham, 1991    |
| 2. I find the related training difficult to learn.                                  | Foxon, 1995; Noe, 1986; Wexley & Latham, 1991                          |
| 3. I have motivation to use the information I have learned in the classroom.        | Foxon, 1995; Huczynski & Lewis, 1980; Noe, 1986; Wexley & Latham, 1991 |
| 4. My employer has policies and procedures to support training.                     | Foxon, 1995; Hendrickson, 1990; Mosel 1957                             |
| 5. I find it frustrating to use the information I have learned.                     | Bandura, 1986; Foxon 1995; Noe, 1986; Gist, Schwoerer & Rosen, 1989    |
| 6. There is inconsistency with my supervisor's view of my work.                     | Blair, 1996; Foxon, 1995; Walton, 1989                                 |
| 7. My supervisor and journeyman support training so we can do new types of work.    | Foxon, 1995; Michalak, 1981; Wexley & Baldwin, 1986                    |
| 8. What I learned in related training does not relate to work practices.            | Foxon, 1995; Terborg, 1981; Quinones et al., 1993                      |
| 9. I have support from other apprentices when using new information                 | Baldwin & Ford, 1988; Foxon, 1995; Noe, 1986                           |
| 10. I experience pressure to do more on my job.                                     | Baldwin & Ford, 1988; Foxon, 1995; Noe, 1986                           |
| 11. I find that supervisors and journeymen resist company change in work practices. | Huczynski & Lewis, 1980; Richey, 1992; Rouiller, 1989                  |

Table 1 Continued

| Barrier/Facilitator                                                                           | Source                                                                 |
|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom. | Foxon, 1995; Huczynski & Lewis, 1980; Wexley & Latham, 1991            |
| 13. I lack confidence to use what I learn in the classroom.                                   | Bandura, 1986; Foxon, 1995; Noe, 1986; Gist, Schwoerer & Rosen, 1989   |
| 14. A challenging job assignment is important to me.                                          | Baldwin et al., 1991; Foxon, 1995; Noe, 1986; Wexley & Latham, 1991    |
| 15. I am unsure what is expected of me.                                                       | Huczynski & Lewis, 1980; Richey, 1992; Rouiller, 1989                  |
| 16. What I learned is not relevant to the tasks I perform.                                    | Foxon, 1995; Terborg, 1981; Quinones et al., 1993                      |
| 17. I lack on-the-job reinforcement from my supervisor and journeyman.                        | Foxon, 1995; Huczynski & Lewis, 1980                                   |
| 18. My co-workers resist changes in work practices.                                           | Baldwin & Ford, 1988; Foxon, 1995; Noe, 1986                           |
| 19. I have the opportunity to use what I learned in the classroom.                            | Blair, 1996; Ford et al., 1992; Foxon, 1995                            |
| 20. I feel pressure to keep old methods of doing my job.                                      | Baldwin & Ford, 1988; Foxon 1995; Noe, 1986                            |
| 21. I lack time to use the classroom instruction on the job.                                  | Foxon, 1995; Huczynski & Lewis, 1980; Wexley & Latham, 1991            |
| 22. Supervisors and journeymen encourage me to use what I learned in the classroom.           | Foxon 1995; Michalak, 1981; Wexley & Baldwin, 1986                     |
| 23. I find it difficult to complete homework assignments.                                     | Foxon, 1995; Huczynski & Lewis, 1980; Noe, 1986; Wexley & Latham, 1991 |
| 24. Too much time passes between the training and its use on my job.                          | Foxon, 1995; Huczynski & Lewis, 1980                                   |

Table 1 Continued

| Barrier/Facilitator                                                                       | Source                                                                 |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 25. I deal well with unplanned work crises.                                               | Huczynski & Lewis, 1980                                                |
| 26. Supervisors, journeymen, and myself disagree on how I should use what I have learned. | Foxon, 1995; Huczynski & Lewis, 1980                                   |
| 27. I lack knowledge for using what I have learned.                                       | Bandura, 1986; Noe, 1986; Gist, Schwoerer & Rosen, 1989                |
| 28. I am ridiculed by other apprentices when using newly learned skills.                  | Baldwin & Ford, 1988; Noe, 1986                                        |
| 29. I am unable to concentrate while attempting to learn related theory.                  | Foxon, 1995; Noe, 1986; Wexley & Latham, 1991                          |
| 30. I am unaware of my job strengths and weaknesses.                                      | Foxon, 1995; Noe, 1986; Wexley & Latham, 1991                          |
| 31. I prefer habits or old ways of doing things.                                          | Foxon, 1995; Huczynski & Lewis, 1980; Noe, 1986; Wexley & Latham, 1991 |
| 32. I am distracted by my personal problems.                                              | Foxon, 1995                                                            |
| 33. Existing work demands are in conflict with the training.                              | Blair, 1996; Foxon, 1995; Walton, 1989                                 |
| 34. I am allowed to apply related instruction.                                            | Broad & Newstrom, 1992; Foxon, 1995; Long, 1990; Mosel, 1957           |
| 35. Most jobs have proper tools and equipment to apply the training to the job.           | Broad & Newstrom, 1992; Foxon, 1995; Long, 1990; Mosel, 1957           |
| 36. The application of skills on my job is considered low priority by my company.         | Foxon, 1995                                                            |

### Apprenticeship in America

An apprenticeship is "a written agreement, also known as an indenture, that imposes obligations on both the apprentice and employer and provides for a stated number of hours of reasonable continuous employment that offers an approved schedule of training and work experience, supplemented by related instruction. The agreement is registered with an apprenticeship and training council, chamber, government agency, and so forth" (Campbell, 2000, p. 227). On-the-job training is combined with part-time related classroom training conducted over a specified period. Generally, apprentices attend related classroom training one night per week, two nights per week, one day per week, one day every other week, or block release (i.e, released from the job for a pre-specified amount of related classroom training). Upon completion of the apprenticeship training program, the apprentice graduates to the level of journeyman.

Apprenticeship is one type of specialized skill training. It involves a combination of classroom instruction and structured on-the-job training. Upon completion of the program, the apprentices receive credentials that are recognized nationally. Hatcher (1993) stated that it is "utilized where there is more to performing a task than reading instructions or simply watching an expert" (p. 41). According to Coy (1989), apprenticeships are associated with specializations that contain some parts that can only be experienced through practical applications.

An apprenticeship program differs from conventional classroom instruction in the United States. According to Hamilton (1990), apprentices perform real work on the job while under the watchful eye of a journeyman. In many cases, a journeyman acts in the

capacity of a mentor which is defined as a person "that plays a mentoring role by teaching and advising apprentices" (Hamilton, p. 62). The journeyman coaches and shows apprentices how to perform a task properly instead of just telling them (Hamilton).

The idea of a journeyman is critical to the success of any apprenticeship program. Jirikowic (1966) reported that the need for a journeyman instructor is critical to a society where technological changes are frequent and the need for skilled labor is critical. A journeyman instructor serves as both an instructor and mentor, thus allowing the journeyman the opportunity to teach values to the apprentice in addition to skills. Hamilton (1990) concurred, writing that the role of journeyman teacher "must be to teach academic subjects and worker virtues, in addition to a single job" (p. 17).

Depending on the craft or trade, apprenticeship programs generally range from one to six years (Bureau of Labor Statistics, 1991/1992, p. 27). According to Patterson and Hedges (1946), the average time period for an apprenticeship program is between three and four years (p. 29). During the period of apprenticeship, the apprentice works under the close tutelage of a journeyman worker learning day after day, gradually gaining both confidence and competence on the job. The journeyman provides a challenging environment commensurate with a level of work the apprentice can handle. "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).

Advantages of Apprenticeship Programs. According to the U. S. Department of Labor (1989), apprenticeship programs have considerable benefits in preparing skilled workers for the work force. Apprenticeship programs provide apprentices with

environments that combine related classroom training with structured on-the-job training, resulting in the total "learning package." Wonacott (1992) wrote that apprentices "can build technical skills, experience the sharing of tasks, and see how technical tasks relate specifically to theoretical knowledge and interpretation" (p. 1). This is accomplished through the direct observation of journeymen workers and the opportunity to use newly learned skills in a practical environment. On-the job training under the watchful eye of a journeyman worker allows apprentices the opportunity to fully participate in the learning process while performing actual work. This arrangement helps apprentices understand the relationship between theory and practice.

Glover (1980) reported that apprentices are rotated through the various phases of a particular work or job. This is advantageous because it exposes apprentices to various work situations and different journeymen workers, thus giving them an overall picture of a particular craft. "Apprenticeship gives workers versatility by teaching them all aspects of a trade" (Bureau of Labor Statistics, 1991/1992, p. 28). Yao (1995) wrote that "an adequate supply of skilled workers with these qualities is vital to a nation's industrial and economic growth" (p. 59).

Graduates of a quality apprenticeship program are generally better skilled and better educated than those that complete less structured craft training programs (Bureau of Labor Statistics, 1991/1992, p. 28). Because of the quality training received, apprentices are less likely to suffer from an unstable job market and are more likely to find stable employment. "Generally, an organized program of apprenticeship can earn graduates recognition as skilled workers and can ensure them good jobs and good pay"

(Bureau of Labor Statistics, p. 28).

Graduates of quality, structured apprenticeship programs are more likely to receive promotions and better salaries than those that complete other programs. Glover (1980) wrote that graduates of quality, structured apprenticeship programs "tend to advance to supervisory positions more rapidly and more often than do other journeymen" (p. 7).

Components of Apprenticeship. According to the U.S. Department of Labor (1992) Federal Committee on Apprenticeship, there are eight essential elements that comprise American apprenticeship training:

1. Apprenticeship is backed by employers or labor entities that hire and provide training in the workplace. Generally, an apprenticeship program is a combination of related classroom training and supervised on-the-job training.
2. Apprenticeship conducts training in a genuine and verified setting in order to prepare workers for skilled employment. Each industry involved in apprenticeship conducts a needs analysis of the workplace in order to determine training content and length in the classroom and as well as on-the-job training.
3. Apprenticeship is legally governed by federal and state laws and guidelines.
4. An apprenticeship program leads to official credentials via documented completion and journeyman worker status.
5. An apprenticeship program requires an enormous investment of time and money on the part of the sponsor.
6. An apprenticeship program provides workers with monetary earnings during the time of structured on-the-job training based on pre-defined wage scales.
7. An apprenticeship program provides workers with the opportunity to work in a supervised environment of skilled workers and sometimes along side peers.
8. Apprenticeship is comprised of both explicit contractual agreements as well as implicit social responsibilities between apprentices and employers. The contractual agreement outlines what each party involved in the program is responsible for and the implicit agreement includes the rights of the employers

to hire apprentices upon completion of the program and the right of apprentices to expect employment by the sponsor (Yao, 1995).

Role of Government in Apprenticeship. Apprenticeship training programs are prosperous today because of rigorous standards established and maintained by trade unions (Ricucci, 1991). According to Pearson (1974), the federal government actively participates in the promotion of national apprenticeship programs as a result of the combined efforts of trade unions and employers. Ricucci added, "there seems to be growth in apprenticeship spending at the state and local levels of government" (p. 91).

Apprenticeship training programs are registered through the Department of Labor's Bureau of Apprenticeship Training (BAT) and, in many cases, the State Apprenticeship Council (SAC). These programs are managed and directed by training committees. According to Gehan (1990), these committees train all registered apprentices. The trade union apprenticeship programs used in this study are managed and directed by local Joint Apprenticeship Training Committees (JATCs).

The National Apprenticeship Act of 1937, commonly called the Fitzgerald Act, outlines the basic law governing apprenticeship policy in the United States. The Bureau of Apprenticeship and Training (BAT), a part of the United States Department of Labor, administers the laws pertaining to apprenticeship programs. The main focus of the BAT is to provide guidance pertaining to prospective sponsors regarding the design, implementation, and operation of apprenticeship programs (General Accounting Office, 1992; Marshall & Briggs, 1967; U. S. Department of Labor, 1993). The BAT does not provide actual apprenticeship training but does set minimum requirements and standards relating to apprenticeship. According to Kursh (1958), the BAT

"coordinates and makes available information and data on apprenticeships for industry, labor, economists, researchers, educators, community leaders, and other interested parties" (p. 94). Additionally, the BAT provides guidance to prospective sponsors in the following areas:

1. Needs analysis for training development.
2. Development of selection and screening procedures.
3. Development of administrative procedures.
4. Development of related classroom training materials.
5. Evaluation of programs.
6. Predicting future apprenticeship program needs.
7. Registering programs that meet minimum standards.
8. Indenturing of apprentices.
9. Issuing of certificates.
10. Assisting veterans (U. S. Department of Labor, 1993, p. 2).

According to Yao (1995), "the Bureau of Apprenticeship and Training is guided and assisted by the Federal Committee on Apprenticeship [FCA], 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" (p. 52). The FCA serves the Secretary of Labor in the capacity of an advisory group and is chaired by a member of the public selected by the Secretary. The Committee is made up of representatives from labor, management, 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, 1993, p. 11). Glover (1980) concurred, writing that its tasks include providing advice to apprenticeship officials on policy, coordinating research pertaining to apprenticeship programs, and reviewing apprenticeship rules and regulations. Whereas the FCA primarily establishes general regulations relating to apprenticeship programs, the BAT, along with state entities is responsible for the implementation of the regulations.

According to Kursh (1958), the FCA “decides such questions as whether a particular occupation [i.e., electrician, welder, etc.] is an apprenticeable skill, or merely one aspect of a more general skill” (p. 93). Glover (1980) wrote that an apprenticeable trade should possess the following components:

1. It is learned in a practical setting with structured on-the-job training.
2. It is recognized across industry.
3. It involves a minimum of 2000 hours of on-the-job work experience relating to technical, manual, or mechanical skills.
4. It requires supplemented related classroom instruction (pp. 3-4).

The BAT and state agencies are responsible for registering apprenticeship programs that meet minimum training standards and requirements, which typically include:

1. A minimum of 2000 work hours annually, stipulated work schedules for structured on-the-job training.
2. Related classroom instruction (a minimum of 144 hours per year).
3. Supervised on-the-job training.
4. Adequate classroom training accommodations.
5. Process for evaluating related classroom instruction and on-the-job training.

6. Proper documentation.
7. Acceptable ratio of apprentices to journeymen workers.
8. Provide proper safety training, an equal opportunity for all apprentices, and a trial work period.
9. Provide sponsor/apprentice cooperation.
10. Provide minimum requirements for entry into the program.
11. Set a minimum entry age (generally 18).
12. Grant credit for experience in other programs.
13. Set apprentice wage plans.
14. Set apprentice agreements.
15. Assign credit for completion of apprenticeship program.

According to Yao (1995), "only 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" (p. 54). Programs that are successfully registered with the BAT and various state organizations are generally awarded a certificate to recognize this accomplishment (Glover, 1980; Kursh, 1958; Marshall & Briggs, 1967). With proper registration secured, graduates of apprenticeship programs are better able to obtain employment as journeymen.

#### Summary of Related Literature and Research

In summary, a review of related literature and research revealed that the idea of transfer of training has recently become important to business and industry. According to Haskell (1995), transfer is increasingly important to organizations that are required to stay abreast of learning as it pertains to technological, social, and global changes. Broad and

Newstrom (1992) noted that in the past companies assumed that transfer of training was inherent to the process, when, in fact, research has shown that very little training transferred back to the job (Phillips, 1996).

Empirical research related to the transfer of training was sparse at best. Many past researchers concluded that transfer was difficult to achieve. It was not until recently that researchers have begun to conduct empirical research that properly addresses the transfer of related training.

There were five key factors that were thought to affect the transfer of related training. They were organizational environment, supervisory support, peer support, motivation, and self-efficacy. Most researchers agreed that these five factors could either inhibit or facilitate the transfer of related training.

## Chapter III

### Methods and Procedures

#### Purpose of the Study

The purpose of this study was to determine how five previously identified factors (Blair, 1996) related to the transfer of training among the national population of International Brotherhood of Electrical Workers apprentices. To accomplish the purpose of the study, certain independent variables were selected and studied that were believed to either inhibit or facilitate the efficacy of transfer of training.

#### Research Design

The overall design of the study was developmental, ex post facto, descriptive research using a survey technique to collect data. This design was chosen because it was deemed important to study one group in detail. Seeking out a control or comparison group would have been extremely time consuming and costly. Additionally, this design was chosen because the independent variables (demographics) were static and not manipulated.

A survey instrument was developed that was designed to gather perceptions toward barriers/facilitators, which were thought to affect the transfer of training.

#### Population

The selected targeted population for this study was IBEW inside wireman apprentices who were in Joint Apprenticeship Training Committees (JATCs) using the national electrical apprenticeship curriculum. The national training curriculum is developed and coordinated through the National Joint Apprenticeship Training Committee (NJATC).

The NJATC curriculum ensures consistency and helps maintain standards. The NJATC is comprised of representatives of the IBEW and NECA (National Electrical Contractors Association). The NJATC provides guidance to the Executive Director of the NJATC. The NJATC's staff provides training programs, develops curriculum materials, conducts needs analyses and job analyses, works with subject matter experts, develops specific related equipment, suggests standards, and the like. These criteria satisfy the training needs of the IBEW and NECA.

It was determined that the most effective and efficient way to access the apprentices was through their local JATC. A JATC is trade-specific territory established by geographic location. The JATC provides classroom settings and supervises related training. There are 277 IBEW/NECA JATCs in the United States which had 32,480 apprentices at the time of the survey. The Executive Director of the NJATC encouraged surveying all inside wireman apprentices in the United States. The two JATCs used in the pilot study were excluded from the final data collection.

#### Independent Variables

The independent variables were the demographic characteristics of the population. The demographic variables were age, formal education, gender, marital status, military service, number of children, year in apprenticeship program, work days lost in 12 months, and the time format of related classroom training.

#### Dependent Variables

The dependent variables in this study were divided into two main categories according to the Baldwin and Ford (1988) Transfer Process Model and included (a) the

transfer environment and (b) individual characteristics. The two major categories were sub-divided into factors.

The first category is the transfer environment or the apprentices' work environment. According to Baldwin and Ford (1988), this environment is where transfer is thought to occur. This category includes the dependent variables of organizational environment, supervisory support, and peer support. The second category contains the apprentices' individual characteristics and includes the dependent variables of motivation and self-efficacy.

### Instrumentation

The list of 36 barriers/facilitators was used to construct the pilot TTI. Additionally, Converse and Presser (1986) offered the following suggestions: (a) each item must use language that is understandable, (b) each item must be short, and (c) each item must be clear and understandable. Issac and Michael (1995) concurred, suggesting that the items must (a) be appropriate, (b) relate back to the research, (c) be clear, (d) not be leading in nature, (e) ask for knowledge possessed by the respondent, and (f) not ask for information that is too sensitive to the respondent. According to Spector (1992) each question should contain only one idea and must consider the reading level of the respondent. Appendix C, page 176 contains a copy of the pilot instrument. The original pilot instrument was formatted to fit double-sided 8.5 by 14 paper for practical use and convenience.

Specific steps for the development of the pilot TTI are listed below:

1. The review of literature yielded 127 barriers/facilitators thought to affect the transfer of related training.
2. Each barrier/facilitators was written in the form of a statement.

3. Using previous research, titles of factors were changed and adapted to better reflect the list of barriers/facilitators.
4. The statements were organized and validated by the panel of experts to eliminate redundancies and to identify classifications for each of the five factors. The original list of 127 barriers/facilitators was reduced to 36 items by the panel of experts. Those that were similar were categorized under each of the identified factors.
5. Content analysis, a data analysis technique used to find commonalities in data, was performed on the list of barriers/facilitators confirmed by the panel of experts. The researcher determined that commonalities did exist within the list of barriers/facilitators.
6. Each statement (barrier/facilitator) was placed in alphabetical order and then randomized using a random number table.
7. The pilot instrument was formatted.
8. During and after the preliminary meetings with the proposal committee and in concert with the Executive Director of the NJATC (sponsor of study), the demographic (background) variables were formulated and approved.

The pilot TTI contained two parts. The first part contained the final 36 barriers/facilitators that affect the transfer of training. The format used a 5-point Likert scale to determine the degree that each barrier/facilitator helped or hindered the transfer of related training to the job. The second part requested demographic information from apprentices including (a) age, (b) formal education, (c) gender, (d) marital status, and whether your spouse works (e) military service, (f) number of children, (g) year in the apprenticeship program, (h) number of apprentices working with respondent, (i) number of days lost during the past 12 months, (j) the format of related classroom training offered, and (k) previous electrical training. The demographics were chosen by the researcher in concert with the doctoral committee.

Items (d) and (k) were collected at the request of the Executive Director of the

NJATC. Data were collected on item (h) to determine if apprentices were, in fact, working together and to determine if the questions relating to peer support were valid.

Pilot Test. The instrument utilized in the pilot test was approved for use following the completion and submission of Form A, Research with Human Subjects, as required by The University of Tennessee, Knoxville. Two JATCs were then selected that were deemed representative of the national population and were convenient for the researcher to access for the pilot study data collection. These JATCs were the Knoxville and Oak Ridge, Tennessee, JATCs which were excluded from the final data collection.

Meetings were conducted with the Training Directors of the local JATCs selected for the pilot test. At each meeting, an explanation was given to the function of the instrument. After permission was granted, the pilot TTI was administered to 127 IBEW apprentices at the JATCs during evening related classroom training sessions.

The purposes of the pilot TTI were (a) to determine the perceived importance of each barrier/facilitator to the transfer process, (b) to verify that the instrument was user friendly, (c) to verify that each item was clear and understandable, and (d) to assure that the directions were understandable.

The final version of the TTI is included in Appendix D, page 181. Changes to the pilot TTI were made according to the feedback in the form of comments made by the apprentices and from the statistical analysis of data. Specifically, changes were made to the following demographic variables: (a) number of years of formal education completed, (b) number of children, (c) days lost during the past 12 months, and (d) time format of related classroom training.

Reliability statistics, including inner-item correlations and item-total statistics, were performed on the pilot data to ensure all items correlated within their respective factor categories. All statements on the pilot TTI correlated strongly except question 25 which read "I deal well with unplanned work crises." The item-total correlation for question 25 had a value of .1731 compared to questions 13, 27, and 30, which had values of .3646, .4659, and .3539 respectively. Since the item-total correlation was significantly lower for question 25 when compared to the other questions in the self-efficacy group, it was deemed that it did not correlate and was discarded.

After the pilot test, the Likert scale was changed from "never to always" to "strongly disagree to strongly agree." This decision was made because it would be incongruent with the items in the TTI. Additionally, some items on the final TTI were reversed to prevent test taking pattern development. The items that were reversed were re-coded numerically for the statistical analysis. For accuracy, items were re-coded to read 1 = strongly agree and 5 = strongly disagree.

Data Collection Procedures. The final approved version of the TTI was mailed to all remaining JATC training directors to administer to their apprentices. Packets of questionnaires were mailed to the training directors of the 275 JATCs. The packets contained instruments in a sufficient number for each JATC. The Executive Director of the NJATC wanted to ensure that JATCs received an ample amount of instruments. Each packet included a cover letter attached to the instruments along with a pre-paid return envelope for the instruments. A letter of support from the Executive Director of the NJATC was also supplied with each packet of instruments (see Appendix E, page 186).

A mistake was detected in the final TTI by the Executive Director of the NJATC after the instrument was printed and mailed. The original scale used in the final TTI ranged from "strongly disagree" to "strongly agree." The actual scale contained the word "strongly" instead of "disagree." A bulletin from the Executive Director prompted each training director to read the instructions and make sure the apprentices and journeymen understood that "strongly" meant "disagree." Early frequency counts submitted to the researcher by the Executive Director of the NJATC showed an even distribution of responses, indicating apprentices understood the scale.

After the TTIs were completed, training directors collected the instruments and returned packets to the NJATC office in Washington, D.C. A follow-up e-mail was sent three months after the initial mailing by the Executive Director of the NJATC to non-respondents, reminding them to fill out the TTIs, if they had not already done so, and return them in the pre-paid envelope. Of the 32,480 apprentices surveyed, a total of 19,123 completed and returned the surveys for an overall response rate of 58.9%.

#### Data Analysis

The Statistical Package for the Social Sciences (SPSS) for Windows was used to analyze the data. SPSS was chosen because of its compatibility with most other software packages and its user-friendliness. The researcher-developed TTI was the sole data collection device for the study.

Factor analysis, a statistical procedure used to determine if patterns, commonalities, and relationships exist between variables, was used to study the perceptions of barriers/facilitators that affect the transfer of training. A factor analysis was

performed following the final collection of data, and was exploratory in nature.

Descriptive statistics (i.e., means, frequencies, and standard deviation) were generated for the demographic items. A multi-analysis of variance (MANOVA) was performed on the data to determine if differences existed among apprentices regarding perceptions of barriers/facilitators to the transfer of related training. When overall significance was found by the MANOVA, a uni-variate procedure was used to test for significant differences among the dependent variables (transfer factors). Additionally, when the uni-variate procedure yielded a significant F statistic, a *Post Hoc* analysis was performed on the demographic variables that contained three or more groups.

#### Summary

The overall design of the study was developmental, ex post facto, descriptive research using a survey technique to collect data. The study was achieved with a researcher-developed survey instrument. The instrument was designed to gather perceptions toward barriers/facilitators thought to affect the transfer of training.

The selected targeted population for this study was 32,480 IBEW inside wireman apprentices who were in Joint Apprenticeship Training Committees (JATCs). A JATC is a trade-specific territory established by geographic location which provides classroom settings and is supervised by a training director.

A list of 36 barriers/facilitators was used to construct the pilot TTI. A pilot test was performed on two local JATCs. Data were collected and analyzed and appropriate changes were made to the pilot TTI. The final approved version was mailed to the 275 remaining JATC training directors to administer to their apprentices.

Factor analysis, a statistical procedure used to determine if patterns, commonalities, and relationships exist between variables, was used to study the perceptions of barriers/facilitators that affect the transfer of training and was exploratory in nature.

The remaining data were analyzed using a three-step process. First, a multi-analysis of variance (MANOVA) was performed on the data to determine if differences existed among apprentices regarding perceptions of barriers/facilitators to the transfer of related training. Secondly, when overall significance was found by the MANOVA, a uni-variate procedure was used to test for significant differences among the dependent variables (transfer factors). Thirdly, when the uni-variate procedure yielded a significant F statistic, a *Post Hoc* analysis was performed on the demographic variables that contained three or more groups.

## Chapter IV

### Analysis of Data and Results

Resources invested in related classroom training are of little benefit and wasted if knowledge, skills, and attitudes do not transfer to the job. According to Phillips (1996), less than 25% of training professionals are evaluating training programs, especially at levels three, four, and five. Studies relating to the evaluation of training, especially the importance of transfer, are critically necessary in order to ensure organizations are getting the most value out of their training programs. In recent years, Human Resource Development professionals have placed a great deal of importance on the transfer of training.

To better understand the transfer process, it was necessary to investigate the apprentices' perceptions of identified factors and barriers/facilitators and their contributions to the transfer of training. A review of literature identified five factors and 127 barriers/facilitators that have been reported to affect the transfer of related training received in a classroom setting to the job.

The 127 barriers/facilitators were reduced to 35 by a panel of experts and categorized under the five factors of organizational environment, supervisory support, peer support, motivation, and self-efficacy. Data were analyzed through factor analysis to determine the salient factors identified by apprentices and to compare them to the factors identified by the literature review. Also, the study sought to determine if there were differences in factors and barriers/facilitators as determined by the apprentices when they were grouped by the demographic variables of age, formal education, gender, marital

status, military service, number of children, year in the apprenticeship program, number of work days lost during the past 12 months, and time format of related classroom training.

The study was accomplished by using a survey instrument (Transfer of Training Inventory) administered to 32,480 and completed by 19,123 (58.9%) apprentices enrolled in a five-year national inside electrical wiremen apprenticeship program sponsored by the IBEW and NECA. The instrument was designed to gather apprentices' perceptions toward factors and barriers/facilitators thought to affect the transfer of training.

Additionally, the study utilized a one-shot case study design (Campbell & Stanley, 1966). This design was chosen because the researcher wanted to study one group in detail only once.

#### Null Hypotheses

The following null hypotheses were tested at the .05 level of significance.

According to Gay (1987), null hypotheses are recommended when the essence of the difference is known.

- H<sub>0</sub>1: There were no significant differences in the perceptions of apprentices toward the transfer factors and the factors identified by the review of literature.
- H<sub>0</sub>2: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of age.
- H<sub>0</sub>3: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of formal education.
- H<sub>0</sub>4: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of gender.
- H<sub>0</sub>5: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of marital status.

H<sub>0</sub>6: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of military service.

H<sub>0</sub>7: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of number of children.

H<sub>0</sub>8: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of year in apprenticeship program.

H<sub>0</sub>9: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of work days lost in 12 months.

H<sub>0</sub>10: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of time format of related training.

Each item of the TTI was categorized under one of the five factors identified earlier in this study. A multi-variate procedure (Pillai's Trace) was then used to test each of the null hypotheses at the .05 level of significance to ascertain the extent to which the apprentices' perceptions were different. According to Gay (1987), statistical significance is revealed when "the obtained coefficient is really different from zero and reflects a true relationship, not a chance relationship" (p. 233). Chapter IV provides a detailed discussion of the analysis of data and results.

### Responses

The target population for this study was IBEW inside wiremen apprentices who were in JATCs, using the national NJATC curriculum. The population included first-year through fifth-year apprentices. First year apprentices had at least 7 months of training and some 5<sup>th</sup> year apprentices had achieved journeyman status by the time they were surveyed. The national population represented 49 of the 50 states within the United States. No data

were returned from the state of Alaska.

At the request of the Executive Director of the NJATC, who provided adequate funding for the survey, the entire population was surveyed via a mail-out survey. A packet of surveys was mailed to the training director of each JATC surveyed. The training directors were responsible for distributing the survey to the apprentices. Surveys were collected by the training directors and mailed to the NJATC. Responses were entered into a computerized database between March, 2000 and August 2000. Of the 32,480 apprentices surveyed, 19,123 responded, for a total response rate of 58.9%. Due to missing data, the total number of responses varies for each hypothesis.

#### Analysis of Data and Statistical Tools Used

The data in Null Hypothesis One were analyzed using an exploratory factor analysis. The exploratory factor analysis was used to establish factor validity and to determine if the apprentices' perceptions toward the identified barriers/facilitators corresponded with the list of barriers/facilitators verified by the panel of experts. Each of the 35 barriers/facilitators was forced to load under one of the five factor analysis components (the same number of factors used in the study).

The data in Null Hypothesis Two were analyzed using a three-step process. First, a multi-variate analysis of variance was used to determine apprentice perceptions toward the transfer of relating training as measured by the TTI. This procedure was both appropriate and necessary before proceeding with the uni-variate test. Specifically, the multi-variate test, Pillai's Trace, was chosen to test for significance across all five-transfer factors for each demographic variable. According to Olson (1976), Pillai's Trace is the most robust

of the four multi-variate tests when the demographic variables contain greater than two groups. Other multi-variate tests include Wilk's lambda, Roy's largest root criteria, and Hotelling-Lawley trace criteria. The Pillai's Trace test was chosen because the demographic variables in this study generally contained more than two groups.

Secondly, when overall significance was found by the multi-variate test Pillai's Trace, a uni-variate test was used to test for significant differences for each transfer factor (organizational environment, supervisory support, peer support, motivation, and self-efficacy) across all demographic variables. According to Larrabee (1982), a follow-up analysis is required when a significant multi-variate test statistic is obtained. Each time the uni-variate procedure was used, it yielded an overall mean score as well as an F value and P value (probability level). The values were then compared to the .05 level of significance.

Thirdly, a *Post Hoc* analysis using a Tukey's Honestly Significant Difference (HSD) was performed on the demographic variables that contained three or more groups when the uni-variate test yielded a significant F statistic. According to Ferguson and Takane (1989), "methods [*Post-Hoc*] are useful for identifying the nature of significant differences found by the overall F tests" (p. 333). Other *Post Hoc* comparisons include, but are not limited to, Fisher's Least Square Difference, Scheffe's Method, Newman Keul's Method, and Duncan's Multiple Range test. Tukey's *Post Hoc* test was selected over the other tests because the comparisons in this study involved simple differences between two means and, thus, was more powerful than the other *Post Hoc* comparisons. The results of the *Post Hoc* analyses are reported in discussion of each of the hypotheses.

Before the exploratory factor analysis was performed, overall descriptive statistics

were performed on each of the five transfer factors and each of the barriers/facilitators thought to inhibit or facilitate the transfer of training. Table 2 provides the rankings, mean scores, and standard deviations of the transfer of training factors. The transfer factors of motivation and peer support had the highest mean scores (3.78 and 3.74 respectively). This indicated that apprentices had higher overall perceptions toward the benefits of motivation and the support of peers when applying newly learned skills to the job. The transfer factors of supervisory support, organizational environment, and self-efficacy were ranked three, four, and five with the mean scores of 3.48, 3.40, and 3.33 respectively. This suggested that apprentices had lower overall perceptions toward the benefits of support from their supervisors, their organization, and their self-confidence when applying newly learned skills to the job.

Table 3 contains overall rankings, mean scores, and standard deviations of each of the transfer of training barrier/facilitator. Items 14, "a challenging job assignment is important to me" (mean = 4.24), 27, "I am ridiculed by other apprentices when using newly learned skills" (mean = 4.21), and 1, "I prefer the variety of work construction offers" (mean = 4.18) received the highest rankings. This suggested that apprentices had higher perceptions toward the benefits of a challenging work assignment and the variety provided by the construction industry. Also, it suggested that peer ridicule can affect apprentices when they are applying newly learned skills to the job. Items 24, "too much time passes between the training and its use on my job" (mean = 3.00) and 11, "I find that supervisors and journeymen resist change in work practices" (mean = 3.00) received the lowest rankings.

**Table 2****Rankings, Mean Scores, and Standard Deviations for Each Transfer Factor**

| Rank/Factor                   | Mean | Standard Deviation |
|-------------------------------|------|--------------------|
| 1. Motivation                 | 3.78 | .5413              |
| 2. Peer Support               | 3.74 | .6509              |
| 3. Supervisory Support        | 3.48 | .6797              |
| 4. Organizational Environment | 3.40 | .6316              |
| 5. Self-Efficacy              | 3.33 | .5148              |

**Table 3****Rankings of Mean Scores, and Standard Deviations for Each Transfer of Training Barrier/Facilitator**

| <b>Ranking/Item Number of Barrier/Facilitator</b> |                                                                              | <b>Mean</b> | <b>Standard Deviation</b> |
|---------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------|
| 1.                                                | 14. A challenging job assignment is important to me.                         | 4.24        | .81                       |
| 2.                                                | 27. I am ridiculed by other apprentices when using newly learned skills.     | 4.21        | .8709                     |
| 3.                                                | 1. I prefer the variety of work construction offers.                         | 4.18        | .79                       |
| 4.                                                | 13. I lack confidence to use what I learn in the classroom.                  | 4.07        | .9963                     |
| 5.                                                | 31. I am distracted by my personal problems.                                 | 4.02        | 1.0380                    |
| 6.                                                | 15. I am unsure what is expected of me.                                      | 3.99        | 1.0496                    |
| 7.                                                | 26. I lack knowledge for using what I have learned.                          | 3.92        | .9603                     |
| 8.                                                | 3. I have motivation to use the information I have learned in the classroom. | 3.88        | .94                       |
| 9.                                                | 6. There is inconsistency with my supervisor's view of my work.              | 3.81        | 1.0718                    |
| 10.                                               | 5. I find it frustrating to use the information I have learned.              | 3.80        | 1.0590                    |
| 11.                                               | 2. I find the related training difficult to learn.                           | 3.79        | 1.0198                    |
| 12.                                               | 17. I lack on-the-job reinforcement from my supervisor and journeyman.       | 3.77        | 1.0359                    |
| 13.                                               | 29. I am unaware of my on-the-job strengths and weaknesses.                  | 3.76        | 1.1152                    |
| 14.                                               | 28. I am unable to concentrate while attempting to learn related theory.     | 3.75        | 1.0806                    |
| 15.                                               | 9. I have support from other apprentices when using new information.         | 3.70        | .95                       |

**Table 3 Continued**

| Ranking/Item | Number of Barrier/Facilitator                                                                 | Mean | Standard Deviation |
|--------------|-----------------------------------------------------------------------------------------------|------|--------------------|
| 16.          | 35. The application of skills on my job is considered a low priority by my employer.          | 3.69 | 1.1268             |
| 17.          | 25. Supervisors, journeymen, and myself disagree on how I should use what I have learned.     | 3.60 | .9719              |
| 18.          | 7. My supervisor and journeyman support training so we can do new types of work.              | 3.57 | 1.09               |
| 19.          | 30. I prefer habits or old ways of doing things.                                              | 3.56 | 1.0311             |
| 20.          | 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom. | 3.49 | 1.1879             |
| 21.          | 33. I am allowed to apply related instruction.                                                | 3.48 | .96                |
| 22.          | 32. Existing work demands are in conflict with the training.                                  | 3.44 | 1.1204             |
| 23.          | 8. What I learn in related training does not relate to work practices.                        | 3.41 | 1.2221             |
| 24.          | 16. What I learned is not relevant to the tasks I perform.                                    | 3.41 | 1.2320             |
| 25.          | 20. I feel pressure to keep old methods of doing my job.                                      | 3.38 | 1.0111             |
| 26.          | 19. I have the opportunity to use what I learned in the classroom.                            | 3.36 | 1.14               |
| 27.          | 34. Most jobs have proper tools and equipment to apply the training to the job.               | 3.35 | 1.21               |
| 28.          | 4. My employer has policies and procedures to support training.                               | 3.34 | 1.06               |
| 29.          | 18. My co-workers resist changes in work practices.                                           | 3.31 | 1.0781             |
| 30.          | 22. Supervisors and journeymen encourage me to use what I learn in the classroom.             | 3.28 | 1.11               |

**Table 3 Continued**

| Ranking/Item Number of Barrier/Facilitator |                                                                             | Mean | Standard Deviation |
|--------------------------------------------|-----------------------------------------------------------------------------|------|--------------------|
| 31.                                        | 21. I lack time to use the classroom instruction on the job.                | 3.23 | 1.1073             |
| 32.                                        | 10. I experience pressure to do more on my job.                             | 3.21 | 1.2226             |
| 33.                                        | 23. I find it difficult to complete homework assignments.                   | 3.18 | 1.2916             |
| 34.                                        | 24. Too much time passes between the training and its use on my job.        | 3.00 | 1.1722             |
| 35.                                        | 11. I find that supervisors and journeymen resist change in work practices. | 3.00 | 1.1356             |

### Null Hypothesis One

Ho<sub>1</sub>: There were no significant differences in the perceptions of apprentices toward the transfer factors and the factors identified by the review of literature.

Null Hypothesis one was tested using an exploratory factor analysis. To establish factor validity, an exploratory factor analysis was performed on the data to determine the desired explanatory concepts. According to Petty (1995), "factor analysis is a technique for achieving parsimony by identifying the smallest number of descriptive terms to explain the maximum amount of common variance in a correlation matrix" (p. 46). A principal-component analysis was the chosen extraction method. Varimax with Kaiser Normalization was applied prior to factor rotation, thus keeping factors with an Eigenvalue of one or greater. This procedure was chosen to eliminate error variance (Tinsley & Tinsley, 1987).

The exploratory factor analysis was used to determine the level of agreement or disagreement between the transfer of training factors identified by the panel of experts, the review of literature, and the components produced by the factor analysis. The exploratory factor analysis yielded significantly different relationships between factors and apprentice perceptions. The factor analysis loadings were reduced to five factors to match the number used in the TTI. Additionally, each item or barrier/facilitator in the TTI is listed individually and categorized under each one of the five factors via an Eigenvalue. A solid line indicates where each item was categorized by the review of literature and the panel of experts. An asterisk is placed by the barrier/facilitator that were found to be significantly different from the original assigned association and the perceptions of IBEW apprentices.

Table 4 contains Eigenvalues for each of the items included in the TTI. Only items with a factor loading of .30 or greater were retained for each of the factors and barriers/facilitators identified. According to Tinsley and Tinsley (1987), the .30 level is an acceptable factor loading level because it shows that the variance for each corresponding variable has been adequately explained by each factor. Additionally, the factor loading of .30 was chosen to make the interpretation of the results of the factor analysis more precise. The initial factor loadings without any factor loading suppression were extremely difficult to read and interpret.

The following tables (tables 5 and 6) provide an interpretation of the factor analysis loadings and include each factor category and the corresponding barriers/facilitators. Table 5 contains a list of barriers/facilitators that were loaded by each factor. Additionally, Table 6 provides the final factors and corresponding barrier/facilitator categories that were verified by the panel of experts. Appendix F, Exhibit 1 provides the traditional format for reporting an exploratory factor analysis.

#### Null Hypotheses - Demographics

- H<sub>0</sub>2: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of age.
- H<sub>0</sub>3: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of formal education.
- H<sub>0</sub>4: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of gender.
- H<sub>0</sub>5: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of marital status.

Table 4

**Rotated Factor Matrix for 35 Barriers/Facilitators of the TTI with Factor Loadings of .30 or Less Suppressed**

| Barriers/<br>Facilitators                                                    | Factor                        |                        |                 |            |                   |
|------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                              | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 1. I prefer the variety of work construction offers.                         |                               |                        |                 | —          | .568*             |
| 2. I find the related training difficult to learn.                           |                               | .556*                  |                 | —          |                   |
| 3. I have motivation to use the information I have learned in the classroom. |                               | .411*                  |                 | —          |                   |
| 4. My employer has policies and procedures to support training.              | .626                          |                        |                 |            |                   |
| 5. I find it frustrating to use the information I have learned.              |                               | .597*                  |                 | —          |                   |
| 6. There is inconsistency with my supervisor's view of my work.              |                               | —                      |                 | .507*      |                   |

Table 4 Continued

| Barriers/<br>Facilitators                                                        | Factor                        |                        |                 |            |                   |
|----------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                  | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 7. My supervisor and journeyman support training so we can do new types of work. | .652*                         | —                      |                 |            |                   |
| 8. What I learn in related training does not relate to work practices.           |                               | .636*                  |                 | —          |                   |
| 9. I have support from other apprentices when using new information.             |                               |                        | —               |            | .391*             |
| 10. I experience pressure to do more on my job.                                  | —                             |                        | .471*           |            |                   |
| 11. I find that supervisors and journeymen resist change in work practices.      |                               | —                      | .707*           |            |                   |

Table 4 Continued

| Barriers/<br>Facilitators                                                                     | Factor                        |                        |                 |            |                   |
|-----------------------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                               | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom. | .530*                         | —                      |                 |            |                   |
| 13. I lack confidence to use what I learn in the classroom.                                   |                               |                        |                 | .491*      | —                 |
| 14. A challenging job assignment is important to me.                                          |                               |                        |                 | —          | .587*             |
| 15. I am unsure what is expected of me.                                                       | —                             |                        |                 | .669*      |                   |
| 16. What I learned is not relevant to the tasks I perform.                                    | —                             | .638*                  |                 |            |                   |
| 17. I lack on-the-job reinforcement from my supervisor and journeyman.                        |                               | —                      |                 | .476*      |                   |

Table 4 Continued

| Barriers/<br>Facilitators                                                         | Factor                        |                        |                 |            |                   |
|-----------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                   | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 18. My co-workers resist changes in work practices.                               |                               |                        | <u>.671</u>     |            |                   |
| 19. I have the opportunity to use what I learned in the classroom.                | .564*                         | —                      |                 |            |                   |
| 20. I feel pressure to keep old methods of doing my job.                          | —                             |                        | .637*           |            |                   |
| 21. I lack time to use the classroom instruction on the job.                      | —                             |                        | .374*           |            |                   |
| 22. Supervisors and journeymen encourage me to use what I learn in the classroom. | .649*                         | —                      |                 |            |                   |
| 23. I find it difficult to complete homework assignments.                         |                               | .555*                  |                 | —          |                   |

Table 4 Continued

| Barriers/<br>Facilitators                                                                                   | Factor                        |                        |                 |            |                   |
|-------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                                             | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 24. Too much<br>time passes<br>between the<br>training and its<br>use on my job.                            | —                             | .487*                  |                 |            |                   |
| 25. Supervisors,<br>journeymen,<br>and myself<br>disagree on<br>how I should<br>use what I<br>have learned. |                               | —                      | .421*           |            |                   |
| 26. I lack<br>knowledge for<br>using what I<br>have learned.                                                |                               |                        |                 | .486*      | —                 |
| 27. I am ridiculed<br>by other<br>apprentices<br>when using<br>newly learned<br>skills.                     |                               |                        | —               | .453*      |                   |
| 28. I am unable to<br>concentrate<br>while<br>attempting to<br>learn related<br>theory.                     |                               | .549*                  |                 |            | —                 |
| 29. I am unaware<br>of my on-the-<br>job strengths<br>and<br>weaknesses.                                    |                               |                        |                 | .570*      | —                 |

Table 4 Continued

| Barriers/<br>Facilitators                                                                                 | Factor                        |                        |                 |            |                   |
|-----------------------------------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                                           | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 30. I prefer habits<br>or old ways of<br>doing things.                                                    |                               |                        |                 | —          | .385*             |
| 31. I am distracted<br>by my personal<br>problems.                                                        |                               |                        |                 | —          | .377*             |
| 32. Existing work<br>demands are in<br>conflict with<br>the training.                                     | —                             |                        | .406*           |            |                   |
| 33. I am allowed<br>to apply<br>related<br>instruction.                                                   | .567*                         | —                      |                 |            |                   |
| 34. Most jobs have<br>proper tools<br>and equipment<br>to apply the<br>training to the<br>job.            | .447                          |                        |                 |            |                   |
| 35. The<br>application of<br>skills on my<br>job is<br>considered a<br>low priority<br>by my<br>employer. | .401                          |                        |                 |            |                   |

Note. Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization with Rotation Converged in 29 iterations.

**Table 5****Interpretation of Factor Analysis Loadings with Each Factor and Barrier/Facilitator Categorized**

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**Factor 1: Organizational Environment**

- 4. My employer has policies and procedures to support training.
- 7. My supervisor and journeyman support training so we can do new types of work.
- 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom.
- 19. I have the opportunity to use what I learned in the classroom.
- 22. Supervisors and journeymen encourage me to use what I learn in the classroom.
- 33. I am allowed to apply related instruction.
- 34. Most jobs have proper tools and equipment to apply the training to the job.
- 35. The application of skills on my job is considered a low priority by my employer.

**Factor 2: Supervisory Support**

- 2. I find the related training difficult to learn.
- 3. I have motivation to use the information I have learned in the classroom.
- 5. I find it frustrating to use the information I have learned.
- 8. What I learn in related training does not relate to work practices.
- 16. What I learned is not relevant to the tasks I perform.
- 23. I find it difficult to complete homework assignments.
- 24. Too much time passes between the training and its use on my job.
- 28. I am unable to concentrate while attempting to learn related theory.

**Table 5 Continued****Factor 3: Peer Support**

- 10. I experience pressure to do more on my job.
- 11. I find that supervisors and journeymen resist change in work practices.
- 18. My co-workers resist changes in work practices.
- 20. I feel pressure to keep old methods of doing my job.
- 21. I lack time to use the classroom instruction on the job.
- 25. Supervisors, journeymen, and myself disagree on how I should use what I have learned.
- 32. Existing work demands are in conflict with the training.

**Factor 4: Motivation**

- 6. There is inconsistency with my supervisor's view of my work.
- 13. I lack confidence to use what I learn in the classroom.
- 15. I am unsure what is expected of me.
- 17. I lack on-the-job reinforcement from my supervisor and journeyman.
- 26. I lack knowledge for using what I have learned.
- 27. I am ridiculed by other apprentices when using newly learned skills.
- 29. I am unaware of my on-the-job strengths and weaknesses.

**Factor 5: Self-Efficacy**

- 1. I prefer the variety of work construction offers.
- 9. I have support from other apprentices when using new information.
- 14. A challenging job assignment is important to me.

**Table 5 Continued**

30. I prefer habits or old ways of doing things.

31. I am distracted by my personal problems.

---

**Table 6****Factors and Corresponding Barriers/Facilitators Categories Verified by the Panel of Experts**

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**Organizational Environment**

- 4. My employer has policies and procedures to support training.
- 10. I experience pressure to do more on my job.
- 15. I am unsure what is expected of me on the job.
- 16. What I learned is not relevant to the tasks I perform.
- 20. I feel pressure to keep old methods of doing my job.
- 21. I lack time to use the classroom instruction on the job.
- 24. Too much time passes between the training and its use on my job.
- 32. Existing work demands are in conflict with the training.
- 34. Most jobs have proper tools and equipment to apply the training to the job.
- 35. The application of skills on my job is considered a low priority by my employer.

**Supervisory Support**

- 6. There is inconsistency with my supervisor's view of my work.
- 7. My supervisor and journeyman support training so we can do new types of work.
- 11. I find that supervisors and journeymen resist change in work practices.
- 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom.
- 17. I lack on-the-job reinforcement from my supervisor and journeyman.

**Table 6 Continued**

- 19. I have the opportunity to use what I learned in the classroom.
- 22. Supervisors and journeymen encourage me to use what I learn in the classroom.
- 25. Supervisors, journeymen, and I disagree on how I should use what I have learned.
- 33. I am allowed to apply related instruction.

**Peer Support**

- 9. I have support from other apprentices when using new information learned in the classroom.
- 18. My co-workers resist changes in work practices.
- 27. I am ridiculed by other apprentices when using newly learned skills.

**Motivation**

- 1. I prefer the variety of work construction offers.
- 2. I find the related training difficult to learn.
- 3. I have motivation to use what I have learned in the classroom.
- 5. I find it frustrating to use the information I have learned.
- 8. What I learned in related training does not relate to work practices.
- 14. A challenging job assignment is important to me.
- 23. I find it difficult to complete homework assignments.
- 30. I prefer habits or old ways of doing things.
- 31. I am distracted by my personal problems.

**Self-Efficacy**

- 13. I lack confidence to use what I learn in the classroom.

**Table 6 Continued**

- 26. I lack knowledge for using what I have learned.
  - 28. I am unable to concentrate while attempting to learn related theory.
  - 29. I am unaware of my on-the-job strengths and weaknesses.
-

H<sub>0</sub>6: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of military service.

H<sub>0</sub>7: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of number of children have.

H<sub>0</sub>8: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of year in apprenticeship program.

H<sub>0</sub>9: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of work days lost in 12 months.

H<sub>0</sub>10: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of time format of related training.

Apprentices were grouped according to their demographic information. Once grouped, the Pillai's Trace multi-variate test was applied to determine if there was significant differences in the overall hypothesis. When a significant difference was found, a uni-variate analysis was performed to determine significant differences in perceptions of factors for the levels of the independent variables. When more than two groups were assigned, a Tukey HSD *Post Hoc* was applied to determine which perception means was significantly different between factors.

The following discussion is provided in the following order: (a) the hypothesis is stated, (b) the demographic independent variable grouping is explained, (c) the results of the Pillai's trace multi-variate test are discussed, (d) the results of the uni-variate test discussed and, if applicable, (e) the results of the Tukey HSD *Post hoc* test are discussed. All hypotheses were tested at the .05 level.

### Null Hypothesis Two - Age

Ho<sub>2</sub>: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of age.

The demographic variable of age was divided into four groups (18-24, 25-30, 31-40, 41-65). Respondents were asked to list their age in the form of an open-ended question. Due to the limitations of SPSS, responses were placed into groups based on the frequencies produced by the descriptive statistics. There were 6,140 apprentices from ages 18 to 24, 6,665 apprentices between ages 25 and 30, 3,932 apprentices between ages 31 and 40, and 1,154 apprentices between ages 41 and 65 responding to the survey.

Table 7 provides descriptive statistics (including age groups, mean scores, and standard deviation) for research participants responding for the demographic variable of age and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F= 9.565, p<.0001$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the independent variable of age. Table 8 contains mean scores, F values, and levels of significance and provides results of the uni-variate

Table 7

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable of Age for Each Factor**

| Factor/Age Group <sub>a</sub>     | Mean  | SD    |
|-----------------------------------|-------|-------|
| <b>Organizational Environment</b> |       |       |
| 18-24                             | 3.41  | .6068 |
| 25-30                             | 3.40  | .6315 |
| 31-40                             | 3.42  | .6491 |
| 41-65                             | 3.44  | .6611 |
| <b>Supervisory Support</b>        |       |       |
| 18-24                             | 3.49* | .6558 |
| 25-30                             | 3.48  | .6771 |
| 31-40                             | 3.49  | .6996 |
| 41-65                             | 3.55* | .6953 |
| <b>Peer Support</b>               |       |       |
| 18-24                             | 3.73* | .6482 |
| 25-30                             | 3.74  | .6465 |
| 31-40                             | 3.77* | .6459 |
| 41-65                             | 3.77  | .6724 |

**Table 7 Continued**

| Factor/Age Group     | Mean  | SD    |
|----------------------|-------|-------|
| <b>Motivation</b>    |       |       |
| 18-24                | 3.75* | .5401 |
| 25-30                | 3.79* | .5345 |
| 31-40                | 3.83* | .5314 |
| 41-65                | 3.88* | .5432 |
| <b>Self-Efficacy</b> |       |       |
| 18-24                | 3.32* | .5051 |
| 25-30                | 3.34* | .5162 |
| 31-40                | 3.35* | .5177 |
| 41-65                | 3.33  | .5114 |

\* $p < .05$ 

Responses and percentages for age variable: 6,140 apprentices between the ages of 18-24 (34.3%), 6,665 apprentices between the ages 25-30 (37.2%), 3,932 apprentices between the ages of 31-40 (22.0%), and 1,154 apprentices between the ages 41-65 (6.5%).

**Table 8****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Age for Each Factor**

| Factor                     | Mean | F      | PR>F   |
|----------------------------|------|--------|--------|
| Organizational Environment | 3.41 | 2.402  | .066   |
| Supervisory Support        | 3.49 | 3.323  | .019*  |
| Peer Support               | 3.75 | 2.743  | .042*  |
| Motivation                 | 3.79 | 31.583 | .0001* |
| Self-Efficacy              | 3.34 | 5.090  | .002*  |

\*p&lt;.05

test, which yielded significant differences for the factors of supervisory support ( $F = 3.323$ ,  $p < .019$ ), peer support ( $F = 2.743$ ,  $p < .042$ ), motivation ( $F = 31.583$ ,  $p < .0001$ ), and self-efficacy ( $F = 5.090$ ,  $p < .002$ ). Appendix F, Exhibit 3 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom. After applying the Tukey *Post Hoc* test, data indicated that all age groups by factors had perceptions that were significantly different toward the factors of supervisory support, peer support, motivation, and self-efficacy. Appendix F, Exhibit 12 provides a visual analysis of the Tukey *Post Hoc* procedure.

Because there were significant differences in the perceptions of the different age groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Null Hypothesis Two-Age was rejected. With regard to the factor of supervisory support, group one (ages 18-24) had a significantly lower mean score than group four (ages 41-65). With regard to the factor of peer support, group one (ages 18-24) had a significantly lower mean score than group three (ages 31-40). With regard to the factor of motivation, group one (ages 18-24) had a significantly lower mean score than groups two (ages 25-30), three (ages 31-40), and four (ages 41-65). Additionally, group two (ages 25-30) had significantly lower mean score than groups three (ages 31-40) and four (ages 41-65). Lastly, regarding the factor of self-efficacy, group one (ages 18-24) had significantly lower mean scores than groups two (ages 25-30) and three (ages 31-40).

#### Null Hypothesis Three - Formal Education

$H_{03}$ : There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of formal education.

Apprentices were grouped according to their educational level (GED, 12 years, 13 years, 14 years, 15 years, and more than 15 years). The groups included General Equivalency Degree (GED), High School Diploma (12 years), 13 years, 14 years, 15 years, more than 15 years. There were 769 apprentices with a GED, 7,179 with a high school diploma, 2,261 with 13 years of formal education, 4,137 with 14 years of formal education, 1,249 with 15 years of formal education, and 2,789 with more than 15 years of formal education who responded to the survey.

Table 9 provides descriptive statistics (including formal education groups, mean scores, and standard deviation) for research participants responding for the demographic variable of formal education and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F=7.439$ ,  $p<.0001$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the independent variable of formal education. Table 10 contains mean scores, F values, and levels of significance and provides results of the uni-variate test, which yielded significant differences for the factors of motivation ( $F=15.318$ ,  $p<.0001$ ) and self-efficacy ( $F=7.968$ ,  $p<.0001$ ). Appendix F, Exhibit 4 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom.

Table 9

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable of Formal Education for Each Factor**

| Factor/Formal Education <sub>a</sub> | Mean | SD    |
|--------------------------------------|------|-------|
| <b>Organizational Environment</b>    |      |       |
| GED                                  | 3.44 | .6414 |
| High School Diploma<br>(12 years)    | 3.42 | .6192 |
| 13 Years                             | 3.42 | .6220 |
| 14 Years                             | 3.40 | .6309 |
| 15 Years                             | 3.38 | .6313 |
| More than 15 Years                   | 3.35 | .6549 |
| <b>Supervisory Support</b>           |      |       |
| GED                                  | 3.51 | .6776 |
| High School Diploma<br>(12 years)    | 3.49 | .6645 |
| 13 Years                             | 3.51 | .6733 |
| 14 Years                             | 3.49 | .6735 |
| 15 Years                             | 3.46 | .6837 |
| More than 15 Years                   | 3.44 | .7148 |

**Table 9 Continued**

| Factor/Formal Education           | Mean  | SD    |
|-----------------------------------|-------|-------|
| <b>Peer Support</b>               |       |       |
| GED                               | 3.71  | .6549 |
| High School Diploma<br>(12 years) | 3.74  | .6532 |
| 13 Years                          | 3.75  | .6236 |
| 14 Years                          | 3.75  | .6395 |
| 15 Years                          | 3.74  | .6453 |
| More than 15 Years                | 3.70  | .6692 |
| <b>Motivation</b>                 |       |       |
| GED                               | 3.77* | .5780 |
| High School Diploma<br>(12 years) | 3.74* | .5455 |
| 13 Years                          | 3.79* | .5234 |
| 14 Years                          | 3.83* | .5242 |
| 15 Years                          | 3.82* | .5307 |
| More than 15 Years                | 3.82* | .5457 |

**Table 9 Continued**

| Factor/Formal Education           | Mean  | SD    |
|-----------------------------------|-------|-------|
| <b>Self-Efficacy</b>              |       |       |
| GED                               | 3.32  | .5128 |
| High School Diploma<br>(12 years) | 3.30* | .5230 |
| 13 Years                          | 3.34  | .4959 |
| 14 Years                          | 3.36* | .4914 |
| 15 Years                          | 3.37  | .5160 |
| More than 15 Years                | 3.36* | .5220 |

\* $p < .05$ 

Responses and percentages for formal education variable: 769 apprentices with GED (4.1%), 7,179 apprentices with high school diploma (39.1%), 2,261 apprentices with 13 years (12.3%), 4,137 apprentices with 14 years (22.5%), 1,249 apprentices with 15 years (6.8%), and 2,789 apprentices with more than 15 years (15.2 %).

**Table 10****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Formal Education for Each Factor**

| Factor                     | Mean | F      | PR>F   |
|----------------------------|------|--------|--------|
| Organizational Environment | 3.40 | .820   | .535   |
| Supervisory Support        | 3.49 | 1.283  | .268   |
| Peer Support               | 3.74 | .943   | .452   |
| Motivation                 | 3.79 | 15.318 | .0001* |
| Self-Efficacy              | 3.33 | 7.968  | .0001* |

\*p<.05

After applying the Tukey *Post Hoc* test, data indicated that all formal education groups by factors had perceptions that were significantly different toward the factors of motivation and self-efficacy. Appendix F, Exhibit 13 provides a visual depiction of the Tukey *Post Hoc* procedure.

Because there were significant differences in the perceptions of the different formal education groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Null Hypothesis Three-Formal Education was rejected. With regard to the factor of motivation, apprentices with a GED had a significantly lower mean score than those with 14 years of formal education. Additionally, apprentices with a high school diploma had a significantly lower mean score than those with 13, 14, 15, and more than 15 years of formal education. Regarding the factor of self-efficacy, apprentices with a high school diploma had a significantly lower mean score than those with 14 and more than 15 years of formal education.

#### Null Hypothesis Four - Gender

H<sub>0</sub>4: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of gender.

The demographic variable of gender was divided into two groups which included 17,660 male apprentices and 848 female apprentices that responded to the survey. Table 11 provides descriptive statistics (including gender grouping, mean scores, and standard deviation) for research participants responding for the demographic variable of gender and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

Table 11

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable of Gender for Each Factor**

| Factor/Gender <sub>a</sub>        | Mean  | SD    |
|-----------------------------------|-------|-------|
| <b>Organizational Environment</b> |       |       |
| Male                              | 3.41  | .6293 |
| Female                            | 3.36  | .6720 |
| <b>Supervisory Support</b>        |       |       |
| Male                              | 3.49  | .6748 |
| Female                            | 3.44  | .7514 |
| <b>Peer Support</b>               |       |       |
| Male                              | 3.74  | .6477 |
| Female                            | 3.74  | .6880 |
| <b>Motivation</b>                 |       |       |
| Male                              | 3.79  | .5402 |
| Female                            | 3.80  | .5401 |
| <b>Self-Efficacy</b>              |       |       |
| Male                              | 3.34* | .5130 |
| Female                            | 3.29* | .5245 |

\* $p < .05$

<sup>a</sup>Responses and percentages for gender variable: 17,660 male apprentices (95.4%) and 848 female apprentices (4.6%).

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F = 3.470$ ,  $p < .004$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the demographic variable of gender. Table 12 contains mean scores, F values, and levels of significance and provides results of the uni-variate test, which yielded significant differences for the factor self-efficacy ( $F = 4.0001$ ,  $p < .046$ ). Appendix F, Exhibit 5 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom.

Because there were significant differences in the perceptions of the different gender groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Null Hypothesis Four-Gender was rejected. With regard to the transfer factor of self-efficacy, female apprentices had significantly lower mean scores than male apprentices.

#### Null Hypothesis Five - Marital Status

H<sub>0</sub>5: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of marital status.

The demographic variable of marital status was divided into three groups (married apprentices, single apprentices, and divorced apprentices). There were 7,973 married apprentices, 9,242 single apprentices, and 1,256 divorced apprentices who responded to the survey. Table 13 provides descriptive statistics (including marriage grouping, mean

Table 12

**Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Gender for Each Factor**

| Factor                     | Mean | F     | PR>F  |
|----------------------------|------|-------|-------|
| Organizational Environment | 3.40 | 2.382 | .123  |
| Supervisory Support        | 3.49 | 1.420 | .233  |
| Peer Support               | 3.74 | .221  | .638  |
| Motivation                 | 3.79 | 2.559 | .110  |
| Self-Efficacy              | 3.34 | 4.000 | .046* |

\*p<.05

**Table 13**

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable of Marital Status for Each Factor**

| Factor/Martial Status <sub>a</sub> | Mean | SD    |
|------------------------------------|------|-------|
| <b>Organizational Environment</b>  |      |       |
| Married                            | 3.40 | .6400 |
| Single                             | 3.41 | .6188 |
| Divorced                           | 3.38 | .6498 |
| <b>Supervisory Support</b>         |      |       |
| Married                            | 3.48 | .6896 |
| Single                             | 3.49 | .6669 |
| Divorced                           | 3.45 | .6976 |
| <b>Peer Support</b>                |      |       |
| Married                            | 3.73 | .6463 |
| Single                             | 3.76 | .6470 |
| Divorced                           | 3.71 | .6736 |

**Table 13 Continued**

| Factor/Martial Status | Mean  | SD    |
|-----------------------|-------|-------|
| <b>Motivation</b>     |       |       |
| Married               | 3.82* | .5367 |
| Single                | 3.77* | .5387 |
| Divorced              | 3.73* | .5554 |
| <b>Self-Efficacy</b>  |       |       |
| Married               | 3.35  | .5125 |
| Single                | 3.33  | .5136 |
| Divorced              | 3.32  | .5136 |

\*p&lt;.05

Responses and percentages for marital status variable: 7,973 married apprentices (43.2%), 9,242 single apprentices (50.0%), and 1,246 divorced apprentices (6.8%).

scores, and standard deviation) for research participants responding for the demographic variable of marital status and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F= 5.866$ ,  $p<.0001$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the demographic variable of marital status. Table 14 contains mean scores, F values, levels of significance, and results of the uni-variate test, which yielded a significant difference for the factor of motivation ( $F=14.680$ ,  $p<.0001$ ). Appendix F, Exhibit 6 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom.

After applying the Tukey *Post Hoc* test, data indicated that all marital status groups by factors had perceptions that were significantly different toward the factor of motivation. Appendix F, Exhibit 14 provides a visual depiction of the Tukey *Post Hoc* procedure.

Because there were significant differences in the perceptions of the different marital status groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Null Hypothesis Five-Marital Status was rejected. Regarding the factor of motivation, divorced and single apprentices had a significantly lower mean score than married apprentices.

**Table 14****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Marital Status for Each Factor**

| Factor                     | Mean | F      | PR>F   |
|----------------------------|------|--------|--------|
| Organizational Environment | 3.41 | .128   | .880   |
| Supervisory Support        | 3.49 | .076   | .927   |
| Peer Support               | 3.74 | 2.441  | .087   |
| Motivation                 | 3.79 | 14.680 | .0001* |
| Self-Efficacy              | 3.34 | 1.172  | .310   |

\*p&lt;.05

### Null Hypothesis Six - Military Service

Ho<sub>6</sub>: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of military service.

The demographic variable of military service was divided into two groups (apprentices without previous military service and apprentices with previous military service). There were 14,362 apprentices without previous military service and 2,997 apprentices with previous military service who responded to the survey. Table 15 provides descriptive statistics (including military service grouping, mean scores, and standard deviation) for research participants responding for the demographic variable of military service and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F = 5.114, p < .0001$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the demographic variable of gender. Table 16 contains mean scores, F values, and levels of significance and provides results of the uni-variate test, which yielded significant differences for the factors of supervisory support ( $F = 5.789, p < .016$ ) and motivation ( $F = 4.988, p < .026$ ). Appendix F, Exhibit 7 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom. Because there were significant differences in the perceptions of the

Table 15

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable of Military Service for Each Factor**

| Factor/Military Service <sub>a</sub> | Mean  | SD    |
|--------------------------------------|-------|-------|
| <b>Organizational Environment</b>    |       |       |
| No                                   | 3.41  | .6218 |
| Yes                                  | 3.38  | .6711 |
| <b>Supervisory Support</b>           |       |       |
| No                                   | 3.50* | .6694 |
| Yes                                  | 3.45* | .7119 |
| <b>Peer Support</b>                  |       |       |
| No                                   | 3.75  | .6445 |
| Yes                                  | 3.71  | .6653 |
| <b>Motivation</b>                    |       |       |
| No                                   | 3.79* | .5371 |
| Yes                                  | 3.81* | .5444 |
| <b>Self-Efficacy</b>                 |       |       |
| No                                   | 3.34  | .5104 |
| Yes                                  | 3.35  | .5071 |

\* $p < .05$

<sub>a</sub>Responses and percentages for military service variable: 14,362 apprentices without military service (82.7%) and 2,997 apprentices with military service (17.3%).

**Table 16****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Military Service for Each Factor**

| Factor                     | Mean | F      | PR>F  |
|----------------------------|------|--------|-------|
| Organizational Environment | 3.41 | 3.656  | .056  |
| Supervisory Support        | 3.49 | 5.789* | .016* |
| Peer Support               | 3.74 | 1.979  | .159  |
| Motivation                 | 3.79 | 4.988* | .026* |
| Self-Efficacy              | 3.34 | .975   | .323  |

\*p&lt;.05

different military service groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Null Hypothesis Six-Military Service was rejected. With regard to the factor of supervisory support, apprentices with military service had a significantly lower mean score than those without military service. With regard to the factor of motivation, apprentices without military service had a significantly lower mean score than those with military service.

#### Null Hypothesis Seven - Number of Children

H<sub>0</sub>7: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of number of children.

The demographic variable of number of children was divided into four categories (apprentices with zero children, apprentices with one child, apprentices with two children, and apprentices with between three and nine children). The TTI asked respondents to list the number of children they have in the form of an open-ended question. Due to the limitations of SPSS, open-ended questions were placed into categories based on the frequencies produced by the descriptive statistics. There were 9,052 apprentices with zero children, 3,316 apprentices with one child, 2,872 apprentices with two children, and 1,963 apprentices with between three and nine children. Table 17 provides descriptive statistics (including number of children grouping, mean scores, and standard deviation) for research participants responding for the demographic variable of number of children and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

Table 17

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable of Number of Children for Each Factor**

| Factor/Number of Children <sub>a</sub> | Mean  | SD    |
|----------------------------------------|-------|-------|
| <b>Organizational Environment</b>      |       |       |
| 0                                      | 3.41* | .6192 |
| 1                                      | 3.39  | .6453 |
| 2                                      | 3.44* | .6398 |
| 3-9                                    | 3.41  | .6436 |
| <b>Supervisory Support</b>             |       |       |
| 0                                      | 3.50  | .6654 |
| 1                                      | 3.46  | .6921 |
| 2                                      | 3.50  | .6883 |
| 3-9                                    | 3.48  | .6864 |
| <b>Peer Support</b>                    |       |       |
| 0                                      | 3.75  | .6442 |
| 1                                      | 3.74  | .6711 |
| 2                                      | 3.75  | .6454 |
| 3-9                                    | 3.72  | .6468 |

**Table 17 Continued**

| Factor/Number of Children | Mean  | SD    |
|---------------------------|-------|-------|
| <b>Motivation</b>         |       |       |
| 0                         | 3.78* | .5357 |
| 1                         | 3.78* | .5348 |
| 2                         | 3.82  | .5415 |
| 3-9                       | 3.80  | .5505 |
| <b>Self-Efficacy</b>      |       |       |
| 0                         | 3.34  | .5064 |
| 1                         | 3.32  | .5164 |
| 2                         | 3.34  | .5204 |
| 3-9                       | 3.34  | .5205 |

\*p&lt;.05

Responses and percentages for number of children variable: 9,052 apprentices without children (52.6%), 3,316 apprentices with 1 child (19.3%), 2,872 apprentices with 2 children (16.7%), and 1,963 apprentices with 3-9 children (11.4%).

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F = 2.429, p < .002$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the demographic variable of number of children. Table 18 contains mean scores, F values, and levels of significance and provides results of the uni-variate test, which yielded significant differences for the factors of organizational environment ( $F = 3.157, p < .024$ ) and motivation ( $F = 2.801, p < .038$ ). Appendix F, Exhibit 8 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom.

After applying the Tukey *Post Hoc* test, data indicated that all number of children groups by factors had perceptions that were significantly different toward the factors of organizational environment and motivation. Appendix F, Exhibit 15 provides a visual depiction of the Tukey *Post Hoc* procedure.

Because there were significant differences in the perceptions of apprentices who had different number of children toward the factors that affect the transfer of related classroom training to the job, Null Hypothesis Seven-Number of Children was rejected. With regard to the factor organizational environment, apprentices with one child had a significantly lower mean score than those with two children. Regarding the factor of motivation, apprentices without children had a significantly lower mean score than those with two children.

**Table 18****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Number of Children for Each Factor**

| Factor                     | Mean | F     | PR>F  |
|----------------------------|------|-------|-------|
| Organizational Environment | 3.40 | 3.157 | .024* |
| Supervisory Support        | 3.49 | 2.332 | .072  |
| Peer Support               | 3.74 | 1.384 | .245  |
| Motivation                 | 3.79 | 2.801 | .038* |
| Self-Efficacy              | 3.34 | 1.119 | .340  |

\*p&lt;.05

### Null Hypothesis Eight - Year in Apprenticeship Program

H<sub>0</sub>8: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of year in apprenticeship program.

The demographic variable of year in apprenticeship program was divided into five groups (first-year apprentices, second-year apprentices, third-year apprentices, fourth-year apprentices, and fifth-year apprentices). There were 4,742 first-year apprentices, 3,868 second-year apprentices, 3,471 third-year apprentices, 3,052 fourth-year apprentices, and 3,356 fifth-year apprentices who responded to the survey.

Table 19 provides descriptive statistics (including year in apprenticeship program, number of respondents, corresponding percentages, mean scores, and standard deviation) for research participants responding for the demographic variable of year in apprenticeship program and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F = 34.867$ ,  $p < .0001$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the independent variable of year in apprenticeship program. Table 20 contains mean scores, F values, and levels of significance and provides results of the uni-variate test, which yielded significant differences for the factors of organizational environment ( $F = 96.986$ ,  $p < .0001$ ), supervisory support ( $F = 65.827$ ,

Table 19

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable of Year in Apprenticeship Program for Each Factor**

| Factor/Year in Apprenticeship Program <sub>a</sub> | Mean  | SD    |
|----------------------------------------------------|-------|-------|
| <b>Organizational Environment</b>                  |       |       |
| Year 1                                             | 3.55* | .6076 |
| Year 2                                             | 3.37* | .6147 |
| Year 3                                             | 3.35* | .6389 |
| Year 4                                             | 3.30* | .6256 |
| Year 5                                             | 3.40* | .6401 |
| <b>Supervisory Support</b>                         |       |       |
| Year 1                                             | 3.61* | .6555 |
| Year 2                                             | 3.44* | .6717 |
| Year 3                                             | 3.41* | .6885 |
| Year 4                                             | 3.40* | .6912 |
| Year 5                                             | 3.51* | .6648 |

Table 19 Continued

| Factor/Year in Apprenticeship Program | Mean  | SD    |
|---------------------------------------|-------|-------|
| <b>Peer Support</b>                   |       |       |
| Year 1                                | 3.82* | .6326 |
| Year 2                                | 3.72* | .6393 |
| Year 3                                | 3.70* | .6599 |
| Year 4                                | 3.70* | .6609 |
| Year 5                                | 3.72* | .6525 |
| <b>Motivation</b>                     |       |       |
| Year 1                                | 3.91* | .5151 |
| Year 2                                | 3.73* | .5388 |
| Year 3                                | 3.74* | .5381 |
| Year 4                                | 3.69* | .5434 |
| Year 5                                | 3.81* | .5361 |
| <b>Self-Efficacy</b>                  |       |       |
| Year 1                                | 3.33* | .5032 |
| Year 2                                | 3.31* | .5133 |
| Year 3                                | 3.34* | .5024 |
| Year 4                                | 3.32* | .5271 |
| Year 5                                | 3.38* | .5203 |

\* $p < .05$ 

<sup>a</sup>Responses and percentages for year in apprenticeship program variable: 4,742 first-year apprentices (25.6%), 3,868 second-year apprentices (20.9%), 3,471 third-year apprentices (18.8%), 3,052 fourth-year apprentices (16.5%), and 3,356 fifth-year apprentices (18.2%).

**Table 20****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Year in Apprenticeship Program for Each Factor**

| Factor                     | Mean | F       | PR>F   |
|----------------------------|------|---------|--------|
| Organizational Environment | 3.40 | 96.986  | .0001* |
| Supervisory Support        | 3.48 | 65.827  | .0001* |
| Peer Support               | 3.74 | 25.144  | .0001* |
| Motivation                 | 3.79 | 103.357 | .0001* |
| Self-Efficacy              | 3.34 | 11.170  | .0001* |

\*p&lt;.05

$p < .0001$ ), peer support ( $F = 25.144$ ,  $p < .0001$ ), motivation ( $F = 103.357$ ,  $p < .0001$ ), and self-efficacy ( $F = 11.170$ ,  $p < .0001$ ). Appendix F, Exhibit 9 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom.

After applying the Tukey *Post Hoc* test, data indicated that all year in apprenticeship program groups by factors had perceptions that were significantly different toward the factors of organizational environment, supervisory support, peer support, motivation, and self-efficacy. Appendix F, Exhibit 16 provides a visual depiction of the Tukey *Post Hoc* procedure.

Because there were significant differences in the perceptions of the different year in apprenticeship program groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Hypothesis Eight-Year in Apprenticeship Program was rejected. Table 21 contains the significant differences in mean scores that were found for the year in apprenticeship variable.

#### Null Hypothesis Nine - Work Days Lost in 12 Months Due to Lack of Work

H<sub>0</sub>9: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of work days lost in a 12 months due to lack of work.

The demographic variable of work days lost in 12 months due to lack of work was divided into three categories (0-30 days, 31 to 60 days, and 61 to 99 days). Respondents were asked to list the number of days lost in twelve months due to lack of work in the form of an open-ended question. Due to the limitations of SPSS, open-ended

**Table 21****Significant Differences in Mean Scores for each Factor for Year in Apprenticeship Variable**

| Demographic Variable                  | Factor                            | Significant Differences                                                                                                |
|---------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Year in Apprenticeship Program</b> | <b>Organizational Environment</b> | Second-, third-, fourth-, and fifth-year apprentices had a significantly lower mean score than first-year apprentices. |
|                                       |                                   | Fourth-year apprentices had a significantly lower mean score than second-year apprentices.                             |
|                                       |                                   | Third-year apprentices had a significantly higher mean score than fourth-year apprentices.                             |
|                                       |                                   | Third-year apprentices had a significantly lower mean score than fifth-year apprentices.                               |
|                                       |                                   | Fourth-year apprentices had a significantly lower mean score than fifth-year apprentices.                              |
|                                       | <b>Supervisory Support</b>        | Second-, third-, fourth-, and fifth-year apprentices had a significantly lower mean score than first-year apprentices. |
|                                       |                                   | Fifth-year apprentices had a significantly higher mean score than second-, third-, and fourth-year apprentices.        |
|                                       | <b>Peer Support</b>               | Second-, third-, fourth-, and fifth-year apprentices had a significantly lower mean score than first-year apprentices. |

Table 21 Continued

| Demographic Variable                          | Factor        | Significant Differences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Year in<br/>Apprenticeship<br/>Program</b> | Motivation    | <p>Second-, third-, fourth-, and fifth-year apprentices had a significantly lower mean score than first-year apprentices.</p> <p>Second-year apprentices had a significantly higher mean score than fourth-year apprentices.</p> <p>Third-year apprentices had a significantly higher mean score than fourth-year apprentices.</p> <p>Third-year apprentices had a significantly lower mean score than fifth-year apprentices.</p> <p>Fourth-year apprentices had a significantly lower mean score than second-, third-, and fifth-year apprentices.</p> <p>Fifth-year apprentices had a significantly higher mean score than second-, third-, and fourth-year apprentices.</p> |
|                                               | Self-Efficacy | <p>Fifth-year apprentices had a significantly higher mean score than first-, second-, third-, and fourth-year apprentices.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

questions were placed into groupings based on the frequencies produced by the descriptive statistics. There were 11,273 apprentices who lost between zero and 30 days, 505 apprentices who lost between 31 and 60 days, and 318 apprentices who lost between 61 to 90 days. Table 22 provides descriptive statistics (including number of days lost due to lack of work grouping, mean scores, and standard deviation) for research participants responding for the demographic variable of work days lost in 12 months due to lack of work and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F = 2.359$ ,  $p < .009$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the demographic variable of work days lost in 12 months due to lack of work. Table 23 contains mean scores, F values, and levels of significance and provides results of the uni-variate test, which yielded significant differences for the factors of organizational environment ( $F = 7.351$ ,  $p < .001$ ), supervisory support ( $F = 8.768$ ,  $p < .0001$ ), and peer support ( $F = 4.562$ ,  $p < .010$ ). Appendix F, Exhibit 10 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom.

After applying the Tukey *Post Hoc* test, data indicated that all days lost in 12 months due to lack of work groups by factors had perceptions that were significantly

Table 22

**Factor Descriptive Statistics (Including Number of Responses, Corresponding Percentages, Means of Rating of Barriers/Facilitators, and Standard Deviation) for Variable of Work Days Lost in 12 Months Due to Lack of Work for Each Factor**

| Factor/Work Days Lost in 12 Months <sub>a</sub> | Mean  | SD     |
|-------------------------------------------------|-------|--------|
| <b>Organizational Environment</b>               |       |        |
| 0 to 30 days                                    | 3.41* | .6296  |
| 31 to 60 days                                   | 3.28* | .6391  |
| 61 to 99 days                                   | 3.26* | .6584  |
| <b>Supervisory Support</b>                      |       |        |
| 0 to 30 days                                    | 3.50* | .6749  |
| 31 to 60 days                                   | 3.36* | .6879  |
| 61 to 99 days                                   | 3.35* | .7018  |
| <b>Peer Support</b>                             |       |        |
| 0 to 30 days                                    | 3.75* | .6443* |
| 31 to 60 days                                   | 3.68* | .6670* |
| 61 to 99 days                                   | 3.67  | .6725  |

**Table 22 Continued**

| Factor/Work Days Lost in 12 Months | Mean | SD    |
|------------------------------------|------|-------|
| <b>Motivation</b>                  |      |       |
| 0 to 30 days                       | 3.80 | .5356 |
| 31 to 60 days                      | 3.77 | .5596 |
| 61 to 99 days                      | 3.73 | .5749 |
| <b>Self-Efficacy</b>               |      |       |
| 0 to 30 days                       | 3.35 | .5111 |
| 31 to 60 days                      | 3.31 | .5110 |
| 61 to 99 days                      | 3.32 | .5095 |

\*p&lt;.05

Responses and percentages for days lost in 12 months due to lack of work variable:  
 11,273 apprentices who lost between 0-30 days (93.2%), 505 apprentices who lost 31-60 days (4.2%), and 318 apprentices who lost between 61-99 days (2.6%).

**Table 23****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Work Days Lost in 12 Months Due to Lack of Work for Each Factor**

| Factor                     | Mean | F     | PR>F   |
|----------------------------|------|-------|--------|
| Organizational Environment | 3.40 | 7.351 | .0001* |
| Supervisory Support        | 3.49 | 8.768 | .0001* |
| Peer Support               | 3.74 | 4.562 | .010*  |
| Motivation                 | 3.80 | 1.932 | .145   |
| Self-Efficacy              | 3.34 | .138  | .871   |

\*p&lt;.05

different toward the factors of supervisory support, peer support. Appendix F, Exhibit 17 provides a visual depiction of the Tukey *Post Hoc* procedure.

Because there were significant differences in the perceptions of the different days lost in 12 months due to lack of work groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Null Hypothesis Nine-Days Lost in 12 Months Due to Lack of Work was rejected. With regard to the factor of organizational environment, groups two (31-60 days) and three (61-99 days) had a significantly lower mean score than group one (0-30 days). Regarding the factor of supervisory support, group twos (31-60 days) and three (61-99 days) had a significantly lower mean score than group one (0-30 days). Lastly, with regard to the factor peer support, group two (31-60 days) had a significantly lower mean score than group one (0-30 days).

#### Null Hypothesis Ten - Time Format of Related Classroom Training

H<sub>0</sub>10: There were no significant differences among the apprentices and transfer of training with regard to the demographic variable of time format of related training.

The demographic variable of time format of related classroom training was divided into five groups (one night per week, two nights per week, one day per week, block release, and one day every other week). There were 3,770 apprentices attending one night per week, 10,594 apprentices attending two nights per week, 1,331 apprentices attending one day per week, 251 attending block release, and 1,356 attending one day every other week who responded to the survey.

Table 24 provides descriptive statistics (including time format of related classroom

**Table 24**

**Factor Descriptive Statistics (Including Means of Rating of Barriers/Facilitators and Standard Deviation) for Variable Time Format of Related Classroom Training for Each Factor**

| Factor/Time Format of Related Classroom Training <sub>a</sub> | Mean  | SD    |
|---------------------------------------------------------------|-------|-------|
| <b>Organizational Environment</b>                             |       |       |
| One night per week                                            | 3.44* | .6263 |
| Two nights per week                                           | 3.38* | .6409 |
| One day per week                                              | 3.49* | .5924 |
| Block release                                                 | 3.41  | .5883 |
| One day every other week                                      | 3.43* | .6237 |
| <b>Supervisory Support</b>                                    |       |       |
| One night per week                                            | 3.53* | .6686 |
| Two nights per week                                           | 3.46* | .6900 |
| One day per week                                              | 3.56* | .6384 |
| Block release                                                 | 3.54  | .6149 |
| One day every other week                                      | 3.48* | .6791 |

**Table 24 Continued**

| Factor/Time Format of Related Classroom Training | Mean  | SD    |
|--------------------------------------------------|-------|-------|
| <b>Peer Support</b>                              |       |       |
| One night per week                               | 3.77  | .6342 |
| Two nights per week                              | 3.73  | .6628 |
| One day per week                                 | 3.76  | .6269 |
| Block release                                    | 3.77  | .5920 |
| One day every other week                         | 3.73  | .6246 |
| <b>Motivation</b>                                |       |       |
| One night per week                               | 3.81* | .5333 |
| Two nights per week                              | 3.77* | .5469 |
| One day per week                                 | 3.85  | .5202 |
| Block release                                    | 3.80  | .5176 |
| One day every other week                         | 3.85* | .5153 |
| <b>Self-Efficacy</b>                             |       |       |
| One night per week                               | 3.32  | .5122 |
| Two nights per week                              | 3.34  | .5229 |
| One day per week                                 | 3.33  | .4735 |
| Block release                                    | 3.30  | .4775 |
| One day every other week                         | 3.34  | .4622 |

\*p&lt;.05

Responses and percentages for time format of related training variable: 3,770 one night per week (21.8%), 10,594 two nights per week (61.2%), 1,331 one day per week (7.7%), 251 block release (1.5%), and 1,356 one day every other week (7.8%).

training grouping, number of respondents, corresponding percentages, mean scores, and standard deviation) for research participants responding for the demographic variable of time format of related classroom training and grouped by each transfer of training factor. Additionally, an asterisk is placed by the mean scores found to be significant at the .05 level.

The multi-variate test Pillai's Trace revealed a significant difference existed between perceptions of apprentices toward the five transfer factors that either inhibit or facilitate the transfer of training ( $F=4.556$ ,  $p<.0001$ ). Appendix F, Exhibit 2 provides Pillai's Trace, degrees of freedom, F values, and probability levels. Since the multi-variate test yielded overall significance, a uni-variate analysis was performed to determine significant differences for the levels of the demographic variable of time format of related classroom training. Table 25 contains mean scores, F values, and levels of significance and provides results of the uni-variate test, which yielded significant differences for the factors of organizational environment ( $F=9.116$ ,  $p<.0001$ ), supervisory support ( $F=8.865$ ,  $p<.0001$ ), and motivation ( $F=7.750$ ,  $p<.0001$ ). Appendix F, Exhibit 11 provides the traditional format for reporting a uni-variate analysis and includes the sum of squares and degrees of freedom.

After applying the Tukey *Post Hoc* test, data indicated that all time format of related classroom training groups by factors had perceptions that were significantly different toward the factors organizational environment, supervisory support, and motivation. Appendix F, Exhibit 18 provides a visual depiction of the Tukey *Post Hoc* procedure.

**Table 25****Uni-variate Test for Mean Scores, F Values, and Level of Significance Classified by Time Format of Related Classroom Training for Each Factor**

| Factor                     | Mean | F      | PR>F   |
|----------------------------|------|--------|--------|
| Organizational Environment | 3.40 | 9.116* | .0001* |
| Supervisory Support        | 3.49 | 8.865* | .0001* |
| Peer Support               | 3.74 | 1.784  | .129   |
| Motivation                 | 3.79 | 7.750* | .0001* |
| Self-Efficacy              | 3.34 | 1.156  | .328   |

\*p&lt;.05

Because there were significant differences in the perceptions of the different time format of related classroom training groups of apprentices toward the factors that affect the transfer of related classroom training to the job, Hypothesis Ten-Time Format of Related Classroom Training was rejected. Table 26 contains the significant differences in mean scores for the variable of time format of related classroom training.

Table 26

**Significant Differences in Mean Scores for Each Factor for Time Format of Related Classroom Training**

| Demographic Variable                             | Factor                            | Major Finding                                                                                                                                                           |
|--------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Time Format of Related Classroom Training</b> | <b>Organizational Environment</b> | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one night per week.       |
|                                                  |                                   | Apprentices that attended related training one night per week had a significantly lower mean score than those that attended related training one day per week.          |
|                                                  |                                   | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one day per week.         |
|                                                  |                                   | Apprentices that attended related training one day every other week had a significantly lower mean score than those that attended related training two nights per week. |
|                                                  |                                   | Apprentices that attended related training one day per week had a significantly higher mean score than those that attended related training one day every other week.   |

Table 26 Continued

| Demographic Variable                                     | Factor              | Major Finding                                                                                                                                                                                 |
|----------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Time Format of<br/>Related Classroom<br/>Training</b> | Supervisory Support | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one night per week.                             |
|                                                          |                     | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one day per week.                               |
|                                                          |                     | Apprentices that attended related training one day every other week had a significantly lower mean score than those that attended related training one day per week.                          |
|                                                          | Motivation          | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one night per week.                             |
|                                                          |                     | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one day per week, and one day every other week. |
|                                                          |                     |                                                                                                                                                                                               |

## Chapter V

### Summary, Major Findings, Conclusions, Recommendations, and Implications

This chapter provides a summary, major findings, and conclusions. Additionally, Implications on the area of transfer of related training and recommendations for future research in the area of transfer of related training are offered.

#### Summary

The purpose of this study was to determine how five previously identified factors (Blair, 1996) related to the transfer of training among the national population of International Brotherhood of Electrical Workers apprentices. To accomplish the purpose of the study, certain independent variables were selected and studied that were believed to either inhibit or facilitate the efficacy of transfer of training.

The review of related research revealed that empirical research pertaining to the transfer of related training was, at best, inadequate (Bahn, 1973; Baldwin & Ford, 1988; Bandura, 1986; Quinones et al., 1993). However, the review of related literature documented the importance of the components of the transfer environment (i.e., organizational environment, supervisory support, and peer support) in enhancing the transfer of newly learned skills back to the job. In addition, the review of literature indicated that individual characteristics (i.e., motivation and self-efficacy) were important components of the transfer process. Evidence suggested individuals with higher motivation and self-efficacy were more likely to transfer newly learned skills.

Ten null hypotheses were formulated to help guide the study. The first hypothesis dealt with the grouping of factors into five components or factors to confirm those

identified by the review of literature and verified by the panel of experts. Null hypotheses two through ten dealt with perceptions of apprentices toward the identified factors that affect the transfer of related training when apprentices were grouped by the various demographic variables (age, formal education, gender, marital status, military service, number of children, year in apprenticeship program, work days lost in 12 months, and the time format of related classroom training).

The study utilized a one-shot case study design (Campbell & Stanley, 1966). Apprentices from a national five-year craft trade union apprenticeship program (N = 32,480) responded to the Transfer of Training Inventory (TTI). The TTI was designed to gather perceptions about 35 barriers/facilitators thought to either inhibit or facilitate the transfer of training. Each of the 35 barriers/facilitators was categorized under one of the five factors identified by the review of literature and verified by a panel of experts. The factors were organizational environment, supervisory support, peer support, motivation, and self-efficacy.

Data were compiled and analyzed using SPSS, MicroSoft Windows-based statistical software package. The analysis of data included descriptive statistics, an exploratory factor analysis, a multi-variate test, a uni-variate test, when applicable, follow-up *Post Hoc* analyses.

Descriptive statistics included means, frequencies, and standard deviations were produced for the demographic data (null hypotheses 2 through 9). For null hypothesis one, an exploratory factor analysis was performed to determine if there was a relationship between the five transfer factors identified by the review of literature and the

corresponding factor categories. Additionally, multi-variate and uni-variate tests were used to determine if significant differences existed at the .05 level. The multi-variate and uni-variate tests were used to determine if significant differences in apprentice perceptions existed for the demographic variables in null hypothesis two. The demographic variables used in the study were age, formal education, gender, marital status, military service, number of children, year in the apprenticeship program, number of days lost during the past 12 months, and the time format of related classroom training.

The study found that significant differences in apprentices' perceptions existed for each of the demographic variables. Each group (year of apprenticeship) perceived the factors that affect the transfer of training differently.

### Major Findings

The following major findings are a result of the statistical procedures used to determine if apprentices had different perceptions with regard to the factors and barriers/facilitators that affected the transfer of related training. Table 27 contains the results of the exploratory factor analysis which yielded significantly different relationships between factors and apprentice perceptions. The factor analysis loadings were reduced to five factors to match the number used in the TTI. Additionally, each item or barrier/facilitator in the TTI is listed individually and categorized under each one of the five factors via an Eigenvalue. A solid line indicates where each item was categorized by the review of literature and the panel of experts. An asterisk is placed by the barriers/facilitators that were found to be significantly different from the original assigned association and the perceptions of IBEW apprentices. Table 28 provides the major

Table 27

**Rotated Factor Matrix for 35 Barriers/Facilitators of the TTI with Factor Loadings of .30 or Less Suppressed**

| Barriers/<br>Facilitators                                                    | Factor                        |                        |                 |            |                   |
|------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                              | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 1. I prefer the variety of work construction offers.                         |                               |                        |                 | —          | .568*             |
| 2. I find the related training difficult to learn.                           |                               | .556*                  |                 | —          |                   |
| 3. I have motivation to use the information I have learned in the classroom. |                               | .411*                  |                 | —          |                   |
| 4. My employer has policies and procedures to support training.              | .626                          |                        |                 |            |                   |
| 5. I find it frustrating to use the information I have learned.              |                               | .597*                  |                 | —          |                   |
| 6. There is inconsistency with my supervisor's view of my work.              |                               | —                      |                 | .507*      |                   |

Table 27 Continued

| Barriers/<br>Facilitators                                                                          | Factor                        |                        |                 |            |                   |
|----------------------------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                                    | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 7. My supervisor<br>and<br>journeyman<br>support<br>training so we<br>can do new<br>types of work. | .652*                         | —                      |                 |            |                   |
| 8. What I learn in<br>related training<br>does not relate<br>to work<br>practices.                 |                               | .636*                  |                 | —          |                   |
| 9. I have support<br>from other<br>apprentices<br>when using<br>new<br>information.                |                               |                        | —               |            | .391*             |
| 10. I experience<br>pressure to do<br>more on my<br>job.                                           | —                             |                        | .471*           |            |                   |
| 11. I find that<br>supervisors<br>and<br>journeymen<br>resist change<br>in work<br>practices.      |                               | —                      | .707*           |            |                   |

Table 27 Continued

| Barriers/<br>Facilitators                                                                                       | Factor                        |                        |                 |            |                   |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                                                 | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 12. My supervisor<br>and<br>journeyman do<br>not teach me<br>to use what I<br>have learned in<br>the classroom. | .530*                         | —                      |                 |            |                   |
| 13. I lack<br>confidence to<br>use what I<br>learn in the<br>classroom.                                         |                               |                        |                 | .491*      | —                 |
| 14. A challenging<br>job assignment<br>is important to<br>me.                                                   |                               |                        |                 | —          | .587*             |
| 15. I am unsure<br>what is<br>expected of<br>me.                                                                | —                             |                        |                 | .669*      |                   |
| 16. What I learned<br>is not relevant<br>to the tasks I<br>perform.                                             | —                             | .638*                  |                 |            |                   |
| 17. I lack on-the-<br>job<br>reinforcement<br>from my<br>supervisor and<br>journeyman.                          |                               | —                      |                 | .476*      |                   |

Table 27 Continued

| Barriers/<br>Facilitators                                                         | Factor                        |                        |                 |            |                   |
|-----------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                   | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 18. My co-workers resist changes in work practices.                               |                               |                        | <u>.671</u>     |            |                   |
| 19. I have the opportunity to use what I learned in the classroom.                | .564*                         | —                      |                 |            |                   |
| 20. I feel pressure to keep old methods of doing my job.                          | —                             |                        | .637*           |            |                   |
| 21. I lack time to use the classroom instruction on the job.                      | —                             |                        | .374*           |            |                   |
| 22. Supervisors and journeymen encourage me to use what I learn in the classroom. | .649*                         | —                      |                 |            |                   |
| 23. I find it difficult to complete homework assignments.                         |                               | .555*                  |                 | —          |                   |

Table 27 Continued

| Barriers/<br>Facilitators                                                                 | Factor                        |                        |                 |            |                   |
|-------------------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------|------------|-------------------|
|                                                                                           | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation | Self-<br>Efficacy |
| 24. Too much time passes between the training and its use on my job.                      | —                             | .487*                  |                 |            |                   |
| 25. Supervisors, journeymen, and myself disagree on how I should use what I have learned. |                               | —                      | .421*           |            |                   |
| 26. I lack knowledge for using what I have learned.                                       |                               |                        |                 | .486*      | —                 |
| 27. I am ridiculed by other apprentices when using newly learned skills.                  |                               |                        | —               | .453*      |                   |
| 28. I am unable to concentrate while attempting to learn related theory.                  |                               | .549*                  |                 |            | —                 |
| 29. I am unaware of my on-the-job strengths and weaknesses.                               |                               |                        |                 | .570*      | —                 |

Table 27 Continued

|                                                                                                           | Factor                    |                               |                        |                 |                                 |
|-----------------------------------------------------------------------------------------------------------|---------------------------|-------------------------------|------------------------|-----------------|---------------------------------|
|                                                                                                           | Barriers/<br>Facilitators | Organizational<br>Environment | Supervisory<br>Support | Peer<br>Support | Motivation<br>Self-<br>Efficacy |
| 30. I prefer habits<br>or old ways of<br>doing things.                                                    |                           |                               |                        | —               | .385*                           |
| 31. I am distracted<br>by my personal<br>problems.                                                        |                           |                               |                        | —               | .377*                           |
| 32. Existing work<br>demands are in<br>conflict with<br>the training.                                     |                           | —                             |                        | .406*           |                                 |
| 33. I am allowed<br>to apply<br>related<br>instruction.                                                   |                           | .567*                         | —                      |                 |                                 |
| 34. Most jobs have<br>proper tools<br>and equipment<br>to apply the<br>training to the<br>job.            |                           | .447                          |                        |                 |                                 |
| 35. The<br>application of<br>skills on my<br>job is<br>considered a<br>low priority<br>by my<br>employer. |                           | .401                          |                        |                 |                                 |

Note. Extraction Method: Principal Component Analysis  
Rotation Method: Varimax with Kaiser Normalization with Rotation Converged in 29  
iterations.

Table 28

**Major Findings Classified by Each Demographic Variable for Each Factor**

| Demographic Variable    | Factor              | Major Finding                                                                                                                                       |
|-------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Age</b>              | Supervisory Support | Group 1 (ages 18-24) had a significantly lower mean score than group 4 (ages 41-65).                                                                |
|                         | Peer Support        | Group 1 (ages 18-24) had a significantly lower mean score than group 3 (ages 31-40).                                                                |
|                         | Motivation          | Group 1 (ages 18-24) had a significantly lower mean score than groups 2 (ages 25-30), 3 (ages 31-40), and 4 (ages 41-65).                           |
|                         |                     | Group 2 (ages 25-30) had a significantly lower mean score than groups 3 (ages 31-40) and 4 (ages 41-65).                                            |
|                         | Self-Efficacy       | Group 1 (ages 18-24) had significantly lower mean scores than groups 2 (ages 25-30) and 3 (ages 31-40).                                             |
| <b>Formal Education</b> | Motivation          | Apprentices with a GED had a significantly lower mean score than those with 14 years of formal education.                                           |
|                         |                     | Apprentices with a high school diploma had a significantly lower mean score than those with 13, 14, 15, and more than 15 years of formal education. |
|                         | Self-Efficacy       | Apprentices with a high school diploma had a significantly lower mean score than those with 14 and more than 15 years of formal education.          |

**Table 28 Continued**

| <b>Demographic Variable</b> | <b>Factor</b>                     | <b>Major Finding</b>                                                                                        |
|-----------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Gender</b>               | <b>Self-Efficacy</b>              | Female apprentices had significantly lower mean scores than male apprentices.                               |
| <b>Marital Status</b>       | <b>Motivation</b>                 | Divorced and single apprentices had a significantly lower mean score than married apprentices.              |
| <b>Military Service</b>     | <b>Supervisory Support</b>        | Apprentices with military service had a significantly lower mean score than those without military service. |
|                             | <b>Motivation</b>                 | Apprentices without military service had a significantly lower mean score than those with military service. |
| <b>Number of Children</b>   | <b>Organizational Environment</b> | Apprentices with 1 child had a significantly lower mean score than those with 2 children.                   |
|                             | <b>Motivation</b>                 | Apprentices without children had a significantly lower mean score than those with 2 children.               |

**Table 28 Continued**

| <b>Year in<br/>Apprenticeship<br/>Program</b> | <b>Organizational<br/>Environment</b> | Second-, third-, fourth-, and fifth-year<br>apprentices had a significantly lower<br>mean score than first-year apprentices. |
|-----------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|                                               |                                       | Fourth-year apprentices had a<br>significantly lower mean score than<br>second-year apprentices.                             |
|                                               |                                       | Third-year apprentices had a<br>significantly higher mean score than<br>fourth-year apprentices.                             |
|                                               |                                       | Third-year apprentices had a<br>significantly lower mean score than<br>fifth-year apprentices.                               |
|                                               |                                       | Fourth-year apprentices had a<br>significantly lower mean score than<br>fifth-year apprentices.                              |

Table 28 Continued

| Demographic Variable                 | Factor              | Major Finding                                                                                                          |
|--------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------|
| Year in<br>Apprenticeship<br>Program | Supervisory Support | Second-, third-, fourth-, and fifth-year apprentices had a significantly lower mean score than first-year apprentices. |
|                                      |                     | Fifth-year apprentices had a significantly higher mean score than second-, third-, and fourth-year apprentices.        |
|                                      | Peer Support        | Second-, third-, fourth-, and fifth-year apprentices had a significantly lower mean score than first-year apprentices. |
|                                      | Motivation          | Second-, third-, fourth-, and fifth-year apprentices had a significantly lower mean score than first-year apprentices. |
|                                      |                     | Second-year apprentices had a significantly higher mean score than fourth-year apprentices.                            |
|                                      |                     | Third-year apprentices had a significantly higher mean score than fourth-year apprentices.                             |
|                                      |                     | Third-year apprentices had a significantly lower mean score than fifth-year apprentices.                               |
|                                      |                     | Fourth-year apprentices had a significantly lower mean score than second-, third-, and fifth-year apprentices.         |

**Table 28 Continued**

| <b>Demographic Variable</b>                       | <b>Factor</b>              | <b>Major Finding</b>                                                                                                    |
|---------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Year in Apprenticeship Program</b>             | Motivation                 | Fifth-year apprentices had a significantly higher mean score than second-, third-, and fourth-year apprentices.         |
|                                                   | Self-Efficacy              | Fifth-year apprentices had a significantly higher mean score than first-, second-, third-, and fourth-year apprentices. |
| <b>Days Lost in 12 Months Due to Lack of Work</b> | Organizational Environment | Groups 2 (31 to 60 days) and 3 (61 to 99 days) had a significantly lower mean score than group 1 (0-30 days).           |
|                                                   | Supervisory Support        | Groups 2 (31 to 60 days) and 3 (61 to 99 days) had a significantly lower mean score than group 1 (0-30 days).           |
|                                                   | Peer Support               | Group 2 (31 to 60 days) had a significantly lower mean score than group 1 (0-30 days).                                  |

**Table 28 Continued**

| Demographic Variable                                     | Factor                                | Major Finding                                                                                                                                                           |
|----------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Time Format of<br/>Related Classroom<br/>Training</b> | <b>Organizational<br/>Environment</b> | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one night per week.       |
|                                                          |                                       | Apprentices that attended related training one night per week had a significantly lower mean score than those that attended related training one day per week.          |
|                                                          |                                       | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one day per week.         |
|                                                          |                                       | Apprentices that attended related training one day every other week had a significantly lower mean score than those that attended related training two nights per week. |

Table 28 Continued

| Demographic Variable                                     | Factor                        | Major Finding                                                                                                                                                                                 |
|----------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Time Format of<br/>Related Classroom<br/>Training</b> | Organizational<br>Environment | Apprentices that attended related training one day per week had a significantly higher mean score than those that attended related training one day every other week.                         |
|                                                          |                               | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one night per week.                             |
|                                                          |                               | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one day per week.                               |
|                                                          | Supervisory Support           | Apprentices that attended related training one day every other week had a significantly lower mean score than those that attended related training one day per week.                          |
|                                                          |                               | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one night per week.                             |
|                                                          |                               | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one day per week, and one day every other week. |
|                                                          | Motivation                    | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one night per week.                             |
|                                                          |                               | Apprentices that attended related training two nights per week had a significantly lower mean score than those that attended related training one day per week, and one day every other week. |

findings classified by each demographic variable for each factor.

### Conclusions

Within the limitations and delimitations of the study, the following conclusions were reached. These conclusions are based on the literature review, the analysis of data, and the major findings:

1. The factors affecting the transfer of training were significantly affected by the variable of age. The younger the apprentice, the less effect these factors had on the transfer of training.
2. There was a correlation between apprentices with higher levels of formal education and the transfer factors. Apprentices with post-secondary levels of education were more likely to transfer newly learned skills to the job.
3. Females had less self-efficacy than males in transferring skills to the job. Females did not feel comfortable/confident utilizing skills on the job.
4. Married apprentices were more likely to incorporate the transfer of newly learned skills, perhaps because of a more stable personal life.
5. Apprentices with prior military service were more confident in transferring skills to the job but were more resentful of the factor of supervisory support.
6. Apprentices with one child did not perceive the necessity of their organizational environment. Apprentices without children were less motivated to transfer newly learned skills.
7. The factors affecting the transfer of training were significantly affected by the variable of year in apprenticeship program. The longer apprentices were in the apprenticeship program, the more likely they were to transfer newly learned skills to the job.
8. The factors affecting the transfer of training were significantly affected by the variable of days lost in 12 months due to lack of work. The more days apprentices lost in a calendar year due to lack of work, the less likely they were to transfer newly-learned skills to the job.

9. Apprentices that attended training one day per week were more likely to transfer newly learned skills than any other related training classroom format (i.e., one night per week, two nights per week, block release, and one day every other week).

### Recommendations

Based on the review of related literature, the major findings, and conclusions of this study on factors that affect the transfer of training, the following recommendations are offered:

1. Because younger apprentices did not see the factors of supervisory support, peer support, motivation, and self-efficacy as being as critical to the transfer process, it is recommended that the NJATC instill the importance of these factors early in the apprenticeship program.
2. Because apprentices with higher educational levels were more motivated and self-confident in transferring newly learned skills, it is recommended that the NJATC carefully address apprentices entering the apprenticeship program with lower educational levels.
3. Because male apprentices were more confident than females transferring newly learned skills from the classroom to the job, it is recommended that the NJATC build in measures in the apprenticeship program that ensure female apprentices have equal confidence.
4. Because married apprentices were more motivated to transfer what they learned in the classroom, it is recommended that the NJATC take measures to ensure single and divorced apprentices have the same level of motivation.
5. Because apprentices without military service perceived supervisory support as being more critical to the transfer process and apprentices with military service had increased motivation to transfer newly learned skills, it is recommended that additional research should be conducted to ascertain the relationship between military service and apprenticeship programs.
6. Because apprentices with more children perceived the benefits of their organizational environment and apprentices with more children were more motivated to use what they learned in the classroom, it is recommended that the NJATC build in measures in the apprenticeship program that address apprentices without children.

7. Because apprentices in each year of the apprenticeship program had different perceptions about the factors of organizational environment, supervisory support, peer support, motivation, and self-efficacy, it is recommended that the NJATC review its curriculum to ensure that the transfer of newly learned skills is maximized.
8. Because the study found that apprentices who missed fewer days due to lack of work had higher perceptions with regard to the factors of organizational environment, supervisory support, and motivation, it is recommended that the NJATC work with the IBEW to ensure apprentices are not having difficulty securing employment.
9. Because apprentices that attended different formats of related training had different perceptions toward the benefits of their organizational environment, supervisory support, and motivation, it is recommended that the NJATC carefully review each time format of related classroom training to maximize the transfer of newly learned skills to the job.
10. Based on the data in this study, it is recommended that the NJATC recruit ideal apprenticeship candidates. The profile of the ideal candidate is an older married male without children. Furthermore the ideal candidate should have some post-secondary education, prior military service, be gainfully employed, and be given the opportunity to attend related classroom training one day per week.
11. It is recommended that the study be replicated using a different apprenticeship target population or replicate the study using a control group to make the conclusions empirically sounder and therefore more generalizable.

### Implications

This study focused on the perceptions of apprentices toward factors and barriers/facilitators that inhibited or facilitated the transfer of related training. It is the goal of professionals in training and human resource development to (a) improve knowledge, skills, and attitudes of workers; (b) increase worker on-the-job performance through training; and (c) improve the overall effectiveness of workers resulting in an improved workforce. Hopefully, this study will help those in training and development to better understand the problem of transfer of training.

The outcomes of this study brought to light the different ways apprentices perceived factors and barriers/facilitators that affected the transfer of related training and the need to develop baseline information in this area. This study was intended to serve as a catalyst for future research for furthering the area of transfer of related training.

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## **APPENDICES**

**APPENDIX A**  
**LIST OF BARRIERS/FACILITATORS**

**127 Factors that Inhibit/Facilitate the Transfer of Related Training: Raw Data**

| Barrier/Facilitator                                                            | Barrier/Facilitator                                                            |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 1. Ambiguous definitions of key concepts                                       | 17. Doesn't realize learning relevant to task                                  |
| 2. Application punished or regarded as low priority                            | 18. Don't reinforce application of learning on the job                         |
| 3. Assuming it will just happen                                                | 19. Don't use and/or support application on job                                |
| 4. Benefits of training not clear to top management (thus fail to plan/budget) | 20. Hard to convince adult learners                                            |
| 5. Conflict with existing work demands                                         | 21. Impractical or irrelevant training                                         |
| 6. Course/needs/content /organization mismatch                                 | 22. Inadequate facilities, equipment, and tools                                |
| 7. Content overload resulting in failure to master skills/content              | 23. Inappropriate media/methods                                                |
| 8. Course content organizationally not acceptable                              | 24. Instructor not credible or perceived as qualified                          |
| 9. Course timed too soon/too late/too long, etc.                               | 25. Instructing model inconsistent with application environment                |
| 10. Course used different procedures, forms, etc.                              | 26. Interference from immediate job environment                                |
| 11. Co-workers and/or supervisors performance inconsistent with training       | 27. Knowledge/skills contrary to personal values                               |
| 12. Crude steps, not skills taught and thus unable to apply                    | 28. Lack confidence to apply learning on the job                               |
| 13. Deficits in vital but seemingly unrelated support skills                   | 29. Lack of authority to transfer                                              |
| 14. Delayed application leading to retention loss                              | 30. Lack of equipment prohibits transfer                                       |
| 15. Delayed skill application                                                  | 31. Lack of on-the-job, departmental support, supervisory support for transfer |
| 16. Disadvantages outweigh advantages of transfer                              | 32. Lack of opportunity to apply training                                      |

| Barrier/Facilitator                                                               | Barrier/Facilitator                                           |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------|
| 33. Lack of peer support                                                          | 51. No supervisor/learner agreement regarding outcomes        |
| 34. Lack of motivation to apply/transfer                                          | 52. Non-supportive organizational climate                     |
| 35. Lack of knowledge about methods to promote transfer                           | 53. Non-supportive policies and procedures                    |
| 36. Lack of on-the-job reinforcement                                              | 54. Non support from supervisor                               |
| 37. Lack of perceived relevance                                                   | 55. Non-training problems negatively influence performance    |
| 38. Lack of resources                                                             | 56. Norms and organizational culture do not support learning  |
| 39. Lack of supervisor support and coaching when asked                            | 57. Old habits take over - too difficult to maintain momentum |
| 40. Lack of time                                                                  | 58. Peers, supervisors resist change                          |
| 41. Lacks ability to learn or master content                                      | 59. Penalized for skill transfer                              |
| 42. Learner resists change                                                        | 60. Perceived lack of supervisor support                      |
| 43. Learner lack of confidence                                                    | 61. Perception of how well it will be received                |
| 44. Learner reverts to habits or old ways of doing things                         | 62. Perceptions of unfavorable work environment de-motivates  |
| 45. Learning occurs off job and lacks elements common to job                      | 63. Poor training delivery                                    |
| 46. Management action negative                                                    | 64. Pressure to conform and not to change new methods         |
| 47. Natural work group punishes application, rewards keeping status quo           | 65. Productivity pressures                                    |
| 48. New learning takes time to integrate into existing behaviors                  | 66. Ridicule from peers discourages transfer                  |
| 49. No action taken on evaluative data                                            | 67. Separation from trainer (e.g. consultant)                 |
| 50. No feedback on Learners performance post training to Training and Development | 68. Supervisor not good role model                            |

| Barrier/Facilitator                                                         | Barrier/Facilitator                                                               |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 69. No obvious application of training                                      | 87. Training not generalizable to application setting                             |
| 70. No feedback that application affects results                            | 88. Training not in real world environment                                        |
| 71. Skill overload in course                                                | 89. Training not the solution to the problem                                      |
| 72. Skills taught in steps instead of holistically performed                | 90. Training too soon or too late                                                 |
| 73. Skills training teaches knowledge not skills                            | 91. Transitory personal &/or organizational events distract learner               |
| 74. Supervisor apathy and lack of involvement                               | 92. Unable to give high level of attention                                        |
| 75. Supervisors want training to fix problems they should address           | 93. Unaware of strengths/weaknesses                                               |
| 76. Timing & selection of learner                                           | 94. Unclear course objectives                                                     |
| 77. Trainee already knows the content area                                  | 95. Unfavorable climate                                                           |
| 78. Trainee disagrees with values and concepts taught                       | 96. Unknown or unclear expectations                                               |
| 79. Trainee does not want to be in training course                          | 97. Unplanned (crisis) work                                                       |
| 80. Trainers not skilled in transfer principles                             | 98. Unrealistic expectations about what training can change                       |
| 81. Training a day off/reward                                               | 99. Wrong course selection                                                        |
| 82. T&D strategically isolated and regarded as peripheral                   | 100. Wrong people on wrong course                                                 |
| 83. Training given for no real deficiency                                   | 101. Appropriateness of training - e.g. problem must match solution or vice versa |
| 84. Training has negative image (expectations of certain kinds of training) | 102. Boss allows use of worker methods                                            |
| 85. Training not available when needed                                      | 103. Boss listens to worker ideas                                                 |
| 86. Training not best intervention                                          | 104. Boss open to suggestions                                                     |

| Barrier/Facilitator                                                    | Barrier/Facilitator                                                      |
|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 105. Challenging job assignment                                        | 121. Responsibility of own work                                          |
| 106. Effort to apply by trainee                                        | 122. Risk factor - e.g. complexity of skill, amount of time for mastery  |
| 107. Favorable organizational climate                                  | 123. Supervisor encourages innovative thinking                           |
| 108. Freedom to exchange ideas                                         | 124. Supervisor matches needs of individual by selecting the right class |
| 109. Individual perception of application                              | 125. Supervisory recognition - positive reinforcement                    |
| 110. Job aids                                                          | 126. Team/Peer support - collaborative learning and transfer             |
| 111. Learner comfortable with learned material                         | 127. Training relevance                                                  |
| 112. Management action positive                                        |                                                                          |
| 113. Mastery learning                                                  |                                                                          |
| 114. Motivation to transfer                                            |                                                                          |
| 115. Perceived manager support                                         |                                                                          |
| 116. Performance appraisal - financial incentive for positive transfer |                                                                          |
| 117. Post-training job assignment which reinforces training            |                                                                          |
| 118. Potential applications identified                                 |                                                                          |
| 119. Proper facilities - e.g., software, tools                         |                                                                          |
| 120. Proper instructional design of course                             |                                                                          |

Note. From "Using action planning to facilitate transfer of training", by M. J. Foxon, 1995, Unpublished doctoral dissertation, Florida State University, Tallahassee. Adapted with permission of the author.

**APPENDIX B**  
**PANEL OF EXPERTS**

**Panel of Experts**

The following is an alphabetical list of the panel of experts chosen for this study:

David A. Blair, Ph.D.  
Web Based Training Specialist  
Go-Train Incorporated

Gerald D. Cheek, Ph.D.  
Professor Emeritus  
University of Tennessee, Knoxville

Marguerite Foxon, Ph.D.  
Principal Performance Technologist  
Motorola University  
Motorola

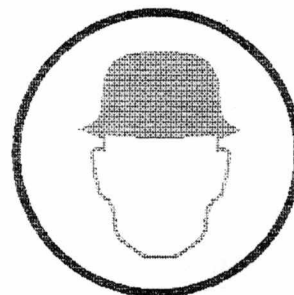
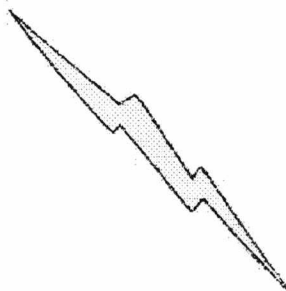
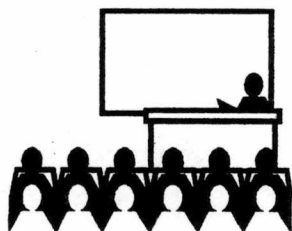
Timothy G. Hatcher, Ed.D.  
Assistant Professor  
Louisville University

A. J. Pearson, M.S.  
Executive Director  
National Joint Apprenticeship Training Committee

Robert H. Schriver, Ph.D.  
Training and Evaluation Specialist  
BWXT Y-12

**APPENDIX C**  
**TRANSFER OF TRAINING**  
**INVENTORY INSTRUMENT:**  
**PILOT VERSION**

# Transfer of Training Inventory



This inventory is designed to gather information about your perceptions of the transfer of training process. Please fill in your response to each item. Completion of this survey acknowledges your voluntary cooperation and all responses will be kept strictly confidential.

Instructions: For each training statement listed below, **circle the number** that most closely reflects your opinion. There are five possible choices for each item:

|              |               |                  |                |               |
|--------------|---------------|------------------|----------------|---------------|
| <u>Never</u> | <u>Seldom</u> | <u>Sometimes</u> | <u>Usually</u> | <u>Always</u> |
| 1            | 2             | 3                | 4              | 5             |

There is no right or wrong answer or time limit. However, please work as quickly as possible. Please respond to every item on the list.

| Think about the classroom training you have just received:                                    |       |   |   |        |   |
|-----------------------------------------------------------------------------------------------|-------|---|---|--------|---|
|                                                                                               | Never |   |   | Always |   |
| 1. I prefer the variety of work construction offers.                                          | 1     | 2 | 3 | 4      | 5 |
| 2. I find the related training difficult to learn.                                            | 1     | 2 | 3 | 4      | 5 |
| 3. I have motivation to use the information I have learned in the classroom.                  | 1     | 2 | 3 | 4      | 5 |
| 4. My employer has policies and procedures to support training.                               | 1     | 2 | 3 | 4      | 5 |
| 5. I find it frustrating to use the information I have learned.                               | 1     | 2 | 3 | 4      | 5 |
| 6. There is inconsistency with my supervisor's view of my work.                               | 1     | 2 | 3 | 4      | 5 |
| 7. My supervisor and journeyman support training so we can do new types of work.              | 1     | 2 | 3 | 4      | 5 |
| 8. What I learn in related training does not relate to work practices.                        | 1     | 2 | 3 | 4      | 5 |
| 9. I have support from other apprentices when using new information.                          | 1     | 2 | 3 | 4      | 5 |
| 10. I experience pressure to do more on my job.                                               | 1     | 2 | 3 | 4      | 5 |
| 11. I find that supervisors and journeymen resist change in work practices.                   | 1     | 2 | 3 | 4      | 5 |
| 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom. | 1     | 2 | 3 | 4      | 5 |
| 13. I lack confidence to use what I learn in the classroom.                                   | 1     | 2 | 3 | 4      | 5 |
| 14. A challenging job assignment is important to me.                                          | 1     | 2 | 3 | 4      | 5 |
| 15. I am unsure what is expected of me.                                                       | 1     | 2 | 3 | 4      | 5 |
| 16. What I learned is not relevant to the tasks I perform.                                    | 1     | 2 | 3 | 4      | 5 |
| 17. I lack on-the-job reinforcement from my supervisor and journeyman.                        | 1     | 2 | 3 | 4      | 5 |
| 18. My co-workers resist changes in work practices.                                           | 1     | 2 | 3 | 4      | 5 |
| 19. I have the opportunity to use what I learned in the classroom.                            | 1     | 2 | 3 | 4      | 5 |

| Think about the classroom training you have just received:                                |       |   |   |        |   |
|-------------------------------------------------------------------------------------------|-------|---|---|--------|---|
|                                                                                           | Never |   |   | Always |   |
| 20. I feel pressure to keep old methods of doing my job.                                  | 1     | 2 | 3 | 4      | 5 |
| 21. I lack time to use the classroom instruction on the job.                              | 1     | 2 | 3 | 4      | 5 |
| 22. Supervisors and journeymen encourage me to use what I learn in the classroom.         | 1     | 2 | 3 | 4      | 5 |
| 23. I find it difficult to complete homework assignments.                                 | 1     | 2 | 3 | 4      | 5 |
| 24. Too much time passes between the training and its use on my job.                      | 1     | 2 | 3 | 4      | 5 |
| 25. I deal well with unplanned work crises.                                               | 1     | 2 | 3 | 4      | 5 |
| 26. Supervisors, journeymen, and myself disagree on how I should use what I have learned. | 1     | 2 | 3 | 4      | 5 |
| 27. I lack knowledge for using what I have learned.                                       | 1     | 2 | 3 | 4      | 5 |
| 28. I am ridiculed by other apprentices when using newly learned skills.                  | 1     | 2 | 3 | 4      | 5 |
| 29. I am unable to concentrate while attempting to learn related theory.                  | 1     | 2 | 3 | 4      | 5 |
| 30. I am unaware of my on-the-job strengths and weaknesses.                               | 1     | 2 | 3 | 4      | 5 |
| 31. I prefer habits or old ways of doing things.                                          | 1     | 2 | 3 | 4      | 5 |
| 32. I am distracted by my personal problems.                                              | 1     | 2 | 3 | 4      | 5 |
| 33. Existing work demands are in conflict with the training.                              | 1     | 2 | 3 | 4      | 5 |
| 34. I am allowed to apply related instruction.                                            | 1     | 2 | 3 | 4      | 5 |
| 35. Most jobs have proper tools and equipment to apply the training to the job.           | 1     | 2 | 3 | 4      | 5 |
| 36. The application of skills on my job is considered a low priority by my employer.      | 1     | 2 | 3 | 4      | 5 |

**Part II****Background Information**

- (1) Age: \_\_\_\_\_ (2) Number of Years of Formal Education Completed: \_\_\_\_\_ (3) Gender:  
\_\_\_\_ Female  
\_\_\_\_ Male

- (5) Marital Status: (6) Military Service: (7) Do you have children?  
\_\_\_\_ Married \_\_\_\_ Yes \_\_\_\_ Yes  
\_\_\_\_ Single \_\_\_\_ No \_\_\_\_ No  
\_\_\_\_ Divorced Number of Children: \_\_\_\_\_

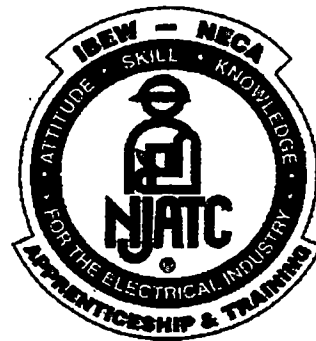
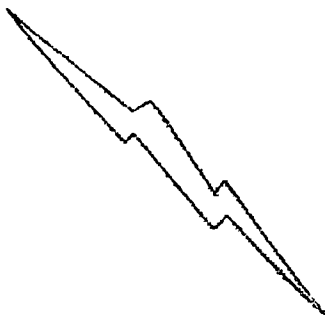
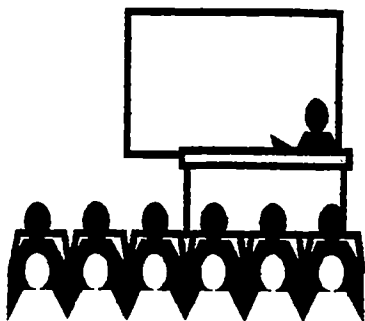
If married, is your spouse working? \_\_\_\_\_

- (8) Year in Apprenticeship: (9) Are Other Apprentices Working With You?  
\_\_\_\_ Year 1 \_\_\_\_ Yes  
\_\_\_\_ Year 2 \_\_\_\_ No  
\_\_\_\_ Year 3  
\_\_\_\_ Year 4  
\_\_\_\_ Year 5  
\_\_\_\_ Journeyman
- (10) How much time did you lose during the past 12 months due to:  
\_\_\_\_ Lack of work  
\_\_\_\_ Inclement Weather  
\_\_\_\_ Vacation/Sickness

- (11) Related Classroom Training Offered: (12) Do You Have Previous Electrical Training?  
\_\_\_\_ One Night Per Week \_\_\_\_ Yes  
\_\_\_\_ Two Nights Per week \_\_\_\_ No  
\_\_\_\_ One Day Per week  
\_\_\_\_ Block Release

**APPENDIX D**  
**TRANSFER OF TRAINING**  
**INVENTORY INSTRUMENT:**  
**FINAL VERSION**

## TRANSFER OF TRAINING INVENTORY



This inventory is designed to gather information about your perceptions of the transfer of training process using and relating what you do and see on the job compared to what you study and learn in related class. Please fill in your response to each item. Completion of this survey acknowledges your voluntary cooperation and all responses will be kept strictly confidential.

### Instructions:

The person administering the survey should provide those filling out the form with the JATC program state and number on the last page in the space provided. Completely fill in the bubble that most closely reflects your opinion. There are five possible choices for each item:

### EXAMPLE

☐ Strongly Disagree    ☒ Disagree    ☐ Not Sure    ☐ Agree    ☐ Strongly Agree

There is no right or wrong answer. Please work as quickly as possible. Please respond to every item on the list.

FOR OFFICE USE ONLY:

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9939232142

**(PART I)****THINK ABOUT THE CLASSROOM TRAINING YOU JUST RECEIVED:**

|                                                                                               | Strongly<br>Disagree  | Strongly              | Not Sure              | Agree                 | Strongly<br>Agree     |
|-----------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. I prefer the variety of work construction offers.                                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. I find the related training difficult to learn.                                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. I have motivation to use what I have learned in the classroom.                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. My employer has policies and procedures to support training.                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. I find it frustrating to use the information I have learned.                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. There is inconsistency with my supervisor's view of my work.                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. My supervisor and journeyman support training so we can do new types of work.              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. What I learn in related training does not relate to work practices.                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. I have support from other apprentices when using new information learned in the classroom. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. I experience pressure to do more on my job.                                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. I find that supervisors and journeymen resist change in work practices.                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. I lack confidence to use what I learn in the classroom.                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. A challenging job assignment is important to me.                                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. I am unsure of what is expected of me on the job.                                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. What I learned is not relevant to the tasks I perform.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. I lack on the job reinforcement from my supervisor and journeyman.                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. My co-workers resist changes in work practices.                                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**THINK ABOUT THE CLASSROOM TRAINING YOU JUST RECEIVED:**

|                                                                                      | Strongly<br>Disagree  | Strongly<br>Agree     | Not Sure              | Agree                 | Strongly<br>Agree     |
|--------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 19. I have the opportunity to use what I learned in the classroom.                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. I feel pressure to keep old methods of doing my job.                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 21. I lack time to use the classroom instruction on the job.                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 22. Supervisors and journeymen encourage me to use what I learn in the classroom.    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. I find it difficult to complete homework assignments.                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. Too much time passes between the training and its use on my job.                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. Supervisors, journeymen, and I disagree on how I should use what I have learned. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 26. I lack knowledge for using what I have learned.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 27. I am ridiculed by other apprentices when using newly learned skills.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 28. I am unable to concentrate while attempting to learn related theory.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 29. I am unaware of my on-the-job strengths and weaknesses.                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 30. I prefer habits or old ways of doing things.                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 31. I am distracted by my personal problems.                                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 32. Existing work demands are in conflict with the training.                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 33. I am allowed to apply related instruction.                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 34. Most jobs have proper tools and equipment to apply the training to the job.      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 35. The application of skills on my job is considered a low priority by my employer. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**FOR OFFICE USE ONLY:**

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**0804232144**

**(PART II)****BACKGROUND INFORMATION**

1. AGE:

|  |  |
|--|--|
|  |  |
|--|--|

Please print numbers well inside the box. Do not touch the line. One number per box.

2. Number of years of formal education completed:

- ☐ GED      ☐ High School Diploma (12 Years)  
☐ 13 Years    ☐ 14 Years  
☐ 15 Years    ☐ More than 15 years

3. Gender: ☐ Male      ☐ Female

4. Marital Status:

- ☐ Married  
☐ Single  
☐ Divorced

5. If Married, Does your spouse work?

- ☐ Yes    ☐ No

6. Military Service:

- ☐ Yes    ☐ No

7. Number of Children:

|  |
|--|
|  |
|--|

8. Year in Apprenticeship or Journeyman Status

- ☐ Year 1      ☐ Year 4  
☐ Year 2      ☐ Year 5  
☐ Year 3      ☐ Journeyman Wireman

9. If Journeyman Wireman, what year did you graduate from the apprenticeship program?

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

10. Are other apprentices working on the same job site with you?

- ☐ Yes ☐ No

11. How many days did you lose during the past 12 months due to:

Lack of Work

|  |  |
|--|--|
|  |  |
|--|--|

Inclement Weather

|  |  |
|--|--|
|  |  |
|--|--|

Vacation/Sickness

|  |  |
|--|--|
|  |  |
|--|--|

Related Training

|  |  |
|--|--|
|  |  |
|--|--|

Other Reasons

|  |  |
|--|--|
|  |  |
|--|--|

12. How much money did you earn in 1999?

\$ 

|  |  |  |  |  |
|--|--|--|--|--|
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|--|--|--|--|--|

 (nearest \$100)

13. Related classroom training offered:

- ☐ One night per week    ☐ One day per week  
☐ Two nights per week    ☐ Block Release\*  
☐ One day every other week

14. Did you have previous electrical training or experience before becoming an IBEW/NECA apprentice?

- ☐ Yes    ☐ No

**\*NOTE: Block release means you attend day classes for a week or more at a time.**

**NOTE: You will need to provide the JATC program number for those completing the form.**

State

Number

|  |  |   |  |  |  |  |
|--|--|---|--|--|--|--|
|  |  | - |  |  |  |  |
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**APPENDIX E**  
**APPROVAL LETTERS FROM THE**  
**EXECUTIVE DIRECTOR**



## National Joint Apprenticeship and Training Committee for the Electrical Industry

A. J. Pearson, Executive Director

Office Hours: 8:45 am - 4:45 pm ET M-F

301 Prince George's Blvd., Suite D, Upper Marlboro, MD 20774

Phone: 301-715-2300 • Business Fax: 301-715-2301 • Order Fax: 301-715-2323

email: [office@njatc.org](mailto:office@njatc.org) • <http://www.njatc.org>



October 25, 1999

The University of Tennessee  
Department of Human Resource Development  
Knoxville, TN 37996

RE: Permission for Research Study

To whom it may concern:

This is to advise that Mr. Mark S. Farris has permission to conduct a research study in the National Joint Apprenticeship and Training Committee (NJATC) Program for the electrical construction industry. The NJATC program is co-sponsored by the International Brotherhood of Electrical Workers (IBEW) and the National Electrical Contractors Association (NECA).

Not only do we grant Mr. Farris permission to conduct his study, but we encourage his work in this needed effort. This study will involve a survey of the perceptions of inside apprentices toward the transfer of training in the NJATC apprenticeship program.

Evaluation is critical to ensure skills are being transferred from the classroom to the job.

We are hopeful this study will benefit not only the IBEW and NECA, but all business and corporations using our services.

It is with pleasure that we can be a part of this effort.

Sincerely,

A. J. Pearson  
Executive Director

AJP:pl



**National Joint Apprenticeship and Training Committee  
for the Electrical Industry**

A.J. Pearson, Executive Director

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**MEMO**

DATE: February 25, 2000  
TO: JATC Training Director or Secretary where there is no Director  
SUBJECT: Related Training Survey

Dear Training Partner:

Business, industry, and educational leaders are becoming more and more concerned about the importance of training evaluation. Evaluation can ensure that we are getting the most return on our training investment. As a leader in industry, you, the training professionals of the IBEW-NECA, are in a unique position to assist in a meaningful research project regarding the transfer of training.

In a joint effort, the University of Tennessee and the NJATC are conducting research on the transfer of training. We need your assistance in administering a short survey to your inside apprentices and journeymen in training.

The survey instrument you are asked to administer will take only a few minutes of your, and their time. It is designed to gather information on their perceptions toward the transfer of training along with some background information. Results of this study will enhance the apprenticeship program. Your assistance in this effort is important.

All replies will be kept strictly confidential. Names are not required on this questionnaire, but we do need the background information on the last page of the instrument.

You, or your designee, will receive: instructions, blank questionnaires, and an Authorized Return Service (ARS) label. Before administering the questionnaire, please read all of the instructions and make sure the participants understand the directions and have no questions.

Each apprentice in your training program should complete one survey form and return it to you or your designee. It is recommended that the survey be given and collected in each training class as a whole, and not taken away by the apprentice or journeyman to complete. Please try to get as many surveys completed as possible.

Your prompt attention to this request is essential to the completion of the study. Your participation is vital and your professionalism is relied upon. In the event we do not receive your completed surveys, we will contact you. Please do not wait to mail your completed inventories. As soon as you are finished, please return them immediately.

I would like to take this opportunity to thank you again for your cooperation and help.

Sincerely,

A.J. Pearson  
Executive Director

**APPENDIX F**  
**EXHIBITS**

**Exhibit 1****Rotated Factor Matrix for Selected Items of the TTI.**  
**With Factor Loadings of .35 or Less Suppressed**

|                                                                                  | Component |      |      |      |      |
|----------------------------------------------------------------------------------|-----------|------|------|------|------|
|                                                                                  | 1         | 2    | 3    | 4    | 5    |
| 1. I prefer the variety of work construction offers.                             |           |      |      |      | .568 |
| 2. I find the related training difficult to learn.                               |           | .556 |      |      |      |
| 3. I have motivation to use the information I have learned in the classroom.     | .399      | .411 |      |      |      |
| 4. My employer has policies and procedures to support training.                  | .626      |      |      |      |      |
| 5. I find it frustrating to use the information I have learned.                  |           | .597 |      |      |      |
| 6. There is inconsistency with my supervisor's view of my work.                  |           |      |      | .507 |      |
| 7. My supervisor and journeyman support training so we can do new types of work. | .652      |      |      |      |      |
| 8. What I learn in related training does not relate to work practices.           | .382      | .636 |      |      |      |
| 9. I have support from other apprentices when using new information.             | .365      |      |      |      | .391 |
| 10. I experience pressure to do more on my job.                                  |           |      | .471 |      |      |

Exhibit Continues

|                                                                                               | Component |      |      |      |      |
|-----------------------------------------------------------------------------------------------|-----------|------|------|------|------|
|                                                                                               | 1         | 2    | 3    | 4    | 5    |
| 11. I find that supervisors and journeymen resist change in work practices.                   |           |      | .707 |      |      |
| 12. My supervisor and journeyman do not teach me to use what I have learned in the classroom. | .530      |      |      |      |      |
| 13. I lack confidence to use what I learn in the classroom.                                   |           | .453 |      | .491 |      |
| 14. A challenging job assignment is important to me.                                          |           |      |      |      | .587 |
| 15. I am unsure what is expected of me.                                                       |           |      |      | .669 |      |
| 16. What I learned is not relevant to the tasks I perform.                                    | .411      | .638 |      |      |      |
| 17. I lack on-the-job reinforcement from my supervisor and journeyman.                        | .417      |      | .350 | .476 |      |
| 18. My co-workers resist changes in work practices.                                           |           |      | .671 |      |      |
| 19. I have the opportunity to use what I learned in the classroom.                            | .564      | .515 |      |      |      |
| 20. I feel pressure to keep old methods of doing my job.                                      |           |      | .637 |      |      |
| 21. I lack time to use the classroom instruction on the job.                                  |           | .371 | .374 |      |      |

Exhibit Continues

|                                                                                           | Component |      |      |      |      |
|-------------------------------------------------------------------------------------------|-----------|------|------|------|------|
|                                                                                           | 1         | 2    | 3    | 4    | 5    |
| 22. Supervisors and journeymen encourage me to use what I learn in the classroom.         | .649      |      |      |      |      |
| 23. I find it difficult to complete homework assignments.                                 |           | .555 |      |      |      |
| 24. Too much time passes between the training and its use on my job.                      |           | .487 |      |      |      |
| 25. Supervisors, journeymen, and myself disagree on how I should use what I have learned. |           |      | .421 |      |      |
| 26. I lack knowledge for using what I have learned.                                       |           | .451 |      | .486 |      |
| 27. I am ridiculed by other apprentices when using newly learned skills.                  |           |      |      | .453 |      |
| 28. I am unable to concentrate while attempting to learn related theory.                  |           | .549 |      |      |      |
| 29. I am unaware of my on-the-job strengths and weaknesses.                               |           |      |      | .570 |      |
| 30. I prefer habits or old ways of doing things.                                          |           |      |      |      | .385 |
| 31. I am distracted by my personal problems.                                              |           |      |      |      | .377 |

Exhibit Continues

|                                                                                      | Component |      |      |      |   |
|--------------------------------------------------------------------------------------|-----------|------|------|------|---|
|                                                                                      | 1         | 2    | 3    | 4    | 5 |
| 32. Existing work demands are in conflict with the training.                         |           | .385 | .406 |      |   |
| 33. I am allowed to apply related instruction.                                       | .567      |      |      |      |   |
| 34. Most jobs have proper tools and equipment to apply the training to the job.      | .447      |      |      |      |   |
| 35. The application of skills on my job is considered a low priority by my employer. | .401      |      |      | .352 |   |

Extraction Method: Principal Component Analysis  
 Rotation Method: Varimax with Kaiser Normalization  
 Rotation Converged in 29 iterations.

Note. Component one yielded the theme of encouragement and support from both the supervisor and the organizational environment. The theme of component two dealt with individual characteristics and included such issues as personal distractions, motivation, and difficulty applying related instruction due to lack of concentration. The theme of component three dealt with external pressure and include demands placed by the organizational environment and the supervisor. The theme of component four involved lack of support in the form of lack of direction, confidence, and reinforcement from the external work environment. Last, the theme of component five addressed variety of work related issues, peer support, and the importance of a challenging job assignment.

**Exhibit 2****Multi-variate Analysis of Variance for Mean Scores of Respondents Classified by Each Independent Variable**

| Independent Variable           | Pillai's Trace | df     | F      | PR>F   |
|--------------------------------|----------------|--------|--------|--------|
| Age                            | .008           | 15.000 | 9.565  | .0001* |
| Formal Education               | .013           | 25.000 | 7.439  | .0001* |
| Gender                         | .001           | 5.000  | 3.470  | .004*  |
| Marital Status                 | .004           | 10.000 | 5.866  | .0001* |
| Military Service               | .002           | 5.000  | 5.114  | .0001* |
| Number of Children             | .002           | 15.000 | 2.429  | .002*  |
| Year in Apprenticeship Program | .037           | 20.000 | 34.867 | .0001* |
| Lack of Work                   | .003           | 10.000 | 2.359  | .009*  |
| Related Training               | .007           | 20.000 | 4.556  | .0001* |

\*p&lt;.05

**Exhibit 3****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Age for Each Dependent Variable**

| Dependent Variable         | Type III Sum of Squares | df | F      | PR>F   |
|----------------------------|-------------------------|----|--------|--------|
| Organizational Environment | 2.852                   | 3  | 2.743  | .066   |
| Supervisory Support        | 4.557                   | 3  | 3.323  | .019*  |
| Peer Support               | 3.463                   | 3  | 2.402  | .042*  |
| Motivation                 | 27.252                  | 3  | 31.583 | .0001* |
| Self-Efficacy              | 4.010                   | 3  | 5.090  | .002*  |

\*p&lt;.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 4****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Formal Education for each Dependent Variable**

| Variable                   | Type III Sum of Squares | df | F      | PR>F   |
|----------------------------|-------------------------|----|--------|--------|
| Organizational Environment | 1.577                   | 5  | .820   | .535   |
| Supervisory Support        | 2.871                   | 5  | 1.283  | .268   |
| Peer Support               | 1.950                   | 5  | .943   | .452   |
| Motivation                 | 21.113                  | 5  | 15.318 | .0001* |
| Self-Efficacy              | 10.152                  | 5  | 7.968  | .0001* |

\*p&lt;.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 5****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Gender for Each Dependent Variable**

| Dependent Variable         | Type III Sum of Squares | df | F      | PR>F  |
|----------------------------|-------------------------|----|--------|-------|
| Organizational Environment | .917                    | 1  | 2.382  | .123  |
| Supervisory Support        | .636                    | 1  | 1.420  | .233  |
| Peer Support               | 9.160E-02               | 1  | .221   | .638  |
| Motivation                 | .706                    | 1  | 2.559  | .110  |
| Self-Efficacy              | 1.019                   | 1  | 4.0001 | .046* |

\*p&lt;.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 6****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Marital Status for Each Dependent Variable**

| Dependent Variable         | Type III Sum of Squares | df | F      | PR>F   |
|----------------------------|-------------------------|----|--------|--------|
| Organizational Environment | 9.844E-02               | 2  | .128   | .880   |
| Supervisory Support        | 6.777E-02               | 2  | .076   | .927   |
| Peer Support               | 2.120                   | 2  | 2.441  | .087   |
| Motivation                 | 8.094                   | 2  | 14.680 | .0001* |
| Self-Efficacy              | .597                    | 2  | 1.172  | .310   |

\*p&lt;.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 7****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Military Service for Each Dependent Variable**

| Dependent Variable         | Type III Sum of Squares | df | F     | PR>F  |
|----------------------------|-------------------------|----|-------|-------|
| Organizational Environment | 1.407                   | 1  | 3.656 | .056  |
| Supervisory Support        | 2.591                   | 1  | 5.789 | .016* |
| Peer Support               | .819                    | 1  | 1.979 | .159  |
| Motivation                 | 1.375                   | 1  | 4.988 | .026* |
| Self-Efficacy              | .249                    | 1  | .975  | .323  |

---

\*p<.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 8****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Number of Children for Each Dependent Variable**

| Dependent Variable         | Type III Sum of Squares | df | F     | PR>F  |
|----------------------------|-------------------------|----|-------|-------|
| Organizational Environment | 3.766                   | 3  | 3.157 | .024* |
| Supervisory Support        | 3.205                   | 3  | 2.332 | .072  |
| Peer Support               | 1.754                   | 3  | 1.384 | .245  |
| Motivation                 | 2.434                   | 3  | 2.801 | .038* |
| Self-Efficacy              | .881                    | 3  | 1.119 | .340  |

\*p&lt;.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 9****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Year in Apprenticeship Program for Each Dependent Variable**

| Dependent Variable         | Type III Sum of Squares | df | F       | PR>F   |
|----------------------------|-------------------------|----|---------|--------|
| Organizational Environment | 151.052                 | 4  | 96.986  | .0001* |
| Supervisory Support        | 119.209                 | 4  | 65.827  | .0001* |
| Peer Support               | 42.174                  | 4  | 25.144  | .0001* |
| Motivation                 | 117.458                 | 4  | 103.357 | .0001* |
| Self-Efficacy              | 11.728                  | 4  | 11.170  | .0001* |

\*p&lt;.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 10****Uni-variate Test (Tests of Between-Subjects Effects) for Mean Scores of Respondents Classified by Days Lost in 12 Months (Lack of Work) for Each Dependent Variable**

| Variable                   | Type III Sum of Squares | df | F     | PR>F   |
|----------------------------|-------------------------|----|-------|--------|
| Organizational Environment | 5.879                   | 2  | 7.351 | .0001* |
| Supervisory Support        | 7.948                   | 2  | 8.768 | .0001* |
| Peer Support               | 3.747                   | 2  | 4.562 | .010*  |
| Motivation                 | 1.107                   | 2  | 1.932 | .145   |
| Self-Efficacy              | 7.146E-02               | 2  | .138  | .871   |

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\*p<.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 11****Tests of Between-Subjects Effects for Mean Scores of Respondents Classified by Time Format of Related Classroom Training**

| Variable                   | Type III Sum of Squares | df | F     | PR>F   |
|----------------------------|-------------------------|----|-------|--------|
| Organizational Environment | 14.031                  | 4  | 9.116 | .0001* |
| Supervisory Support        | 15.870                  | 4  | 8.865 | .0001* |
| Peer Support               | 2.953                   | 4  | 1.784 | .129   |
| Motivation                 | 8.546                   | 4  | 7.750 | .0001* |
| Self-Efficacy              | 1.179                   | 4  | 1.156 | .328   |

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\*p<.05

Note. The exhibit contains the Type III sum of squares and degrees of freedom.

**Exhibit 12****Tukey HSD Procedure for Comparisons of TTI Factor Means for Variable of Age**

| TTI factor                 | Age category <sub>a</sub> |   |   |   |
|----------------------------|---------------------------|---|---|---|
| Organizational environment | 4                         | 3 | 1 | 2 |
| Supervisory support        | 4                         | 3 | 1 | 2 |
| Peer support               | 3                         | 4 | 2 | 1 |
| Motivation                 | 4                         | 3 | 2 | 1 |
| Self-efficacy              | 3                         | 2 | 4 | 1 |

Note. Tukey Procedure

<sub>a</sub>Age Category: (1) 18 to 24 years, (2) 25 to 30 years, (3) 31 to 40 years, (4) 41 to 65 years.

Numbers for each age group are arranged by descending mean scores of each of the five factors. A common underline connects groups for which the HSD analysis detected significant differences.

**Exhibit 13****Tukey HSD Procedure for Comparisons of TTI Factor Means for Variable of Formal Education**

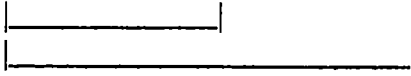
| TTI factor                 | Formal education category <sub>a</sub> |   |   |   |   |   |
|----------------------------|----------------------------------------|---|---|---|---|---|
| Organizational environment | 1                                      | 2 | 3 | 4 | 5 | 6 |
| Supervisory support        | 5                                      | 1 | 3 | 2 | 4 | 6 |
| Peer Support               | 3                                      | 4 | 2 | 5 | 1 | 6 |
| Motivation                 | 4                                      | 5 | 6 | 3 | 1 | 2 |
|                            |                                        |   |   |   |   |   |
| Self-efficacy              | 5                                      | 4 | 6 | 3 | 1 | 2 |
|                            |                                        |   |   |   |   |   |

**Note.** Tukey Procedure

<sup>a</sup>Formal Education Category: (1) GED, (2) 12 years, (3) 13 years, (4) 14 years, (5) 15 years, (6) More than 15 years.

Numbers for each age group are arranged by descending mean scores of each of the five factors. A common underline connects groups for which the HSD analysis detected significant differences.

**Exhibit 14****Tukey HSD Procedure for Comparisons of TTI Factor Means for Variable of Marital Status**

| TTI factor                 | Marital status category <sub>a</sub>                                               |   |   |
|----------------------------|------------------------------------------------------------------------------------|---|---|
| Organizational environment | 2                                                                                  | 1 | 3 |
| Supervisory support        | 2                                                                                  | 1 | 3 |
| Peer support               | 2                                                                                  | 1 | 3 |
| Motivation                 | 1                                                                                  | 2 | 3 |
|                            |  |   |   |
| Self-efficacy              | 1                                                                                  | 2 | 3 |

**Note.** Tukey Procedure**a** Marital Status Category: (1) Married, (2) Single, (3) Divorced.

Numbers for each age group are arranged by descending mean scores of each of the five factors. A common underline connects groups for which the HSD analysis detected significant differences.

**Exhibit 15****Tukey HSD Procedure for Comparisons of TTI Factor Means for Variable of Number of Children**

| TTI factor                 | Number of children category <sub>a</sub> |   |   |   |
|----------------------------|------------------------------------------|---|---|---|
| Organizational environment | 2                                        | 0 | 3 | 1 |
|                            | -----                                    |   |   |   |
| Supervisory support        | 0                                        | 2 | 3 | 1 |
| Peer support               | 0                                        | 2 | 1 | 3 |
| Motivation                 | 2                                        | 3 | 0 | 1 |
|                            | -----                                    |   |   |   |
| Self-efficacy              | 3                                        | 0 | 1 | 2 |

**Note.** Tukey Procedure

<sup>a</sup>Number of Children Category: (0) 0 Children, (1) 1 Child, (2) 2 Children, (3) 3-9 Children.

Numbers for each age group are arranged by descending mean scores of each of the five factors. A common underline connects groups for which the HSD analysis detected significant differences.

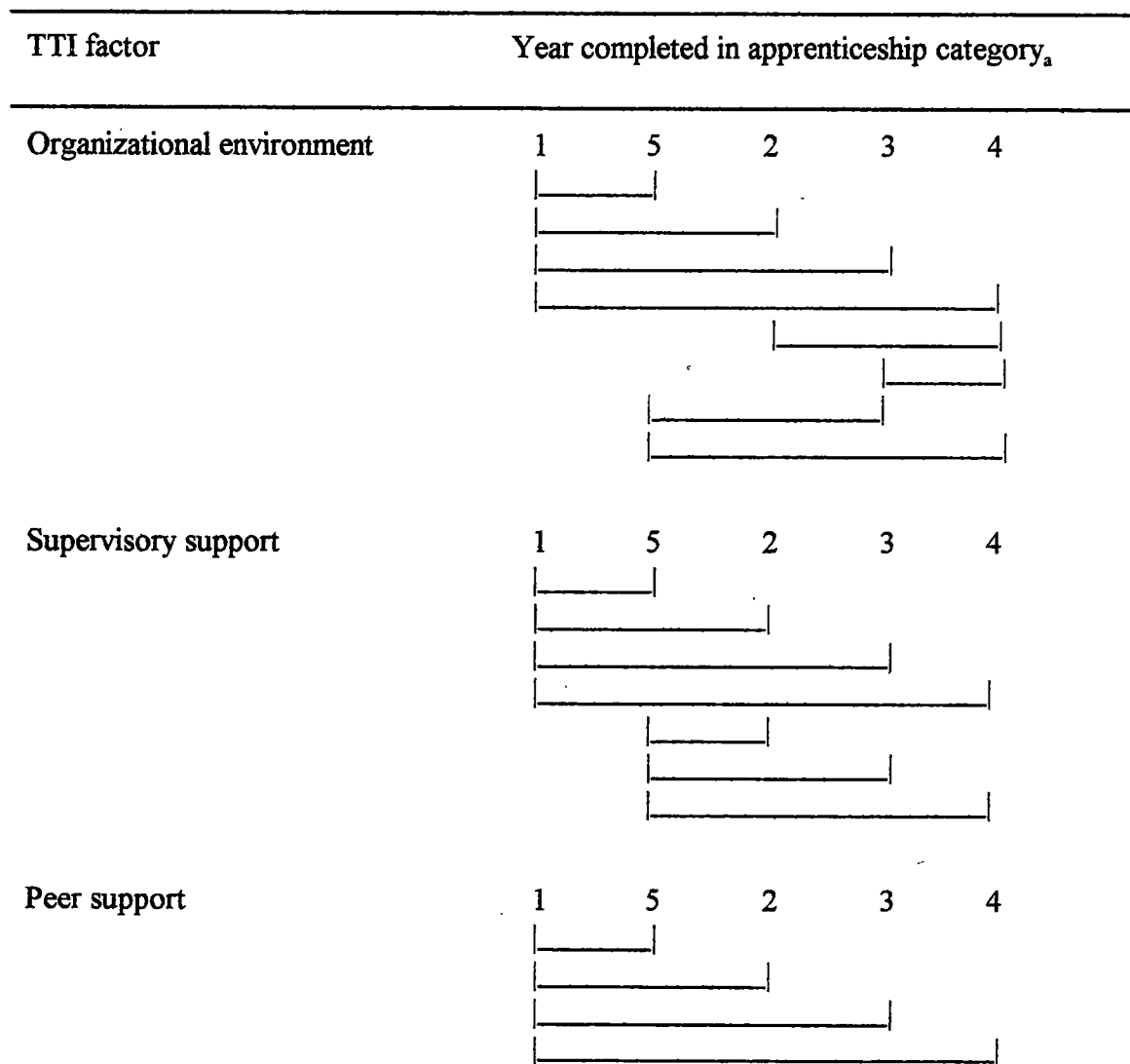
**Exhibit 16****Tukey HSD Procedure for Comparisons of TTI Factor Means for Variable of Year in Apprenticeship**

Exhibit Continues



**Exhibit 17****Tukey HSD Procedure for Comparisons of TTI Factor Means for Variable of Days Lost in the Past 12 Months Due to Lack of Work**

| TTI factor                 | Days lost in the past 12 months due to lack of work category <sub>a</sub> |       |   |
|----------------------------|---------------------------------------------------------------------------|-------|---|
| Organizational environment | 1                                                                         | 2     | 3 |
|                            | _____                                                                     | _____ |   |
| Supervisory support        | 1                                                                         | 2     | 3 |
|                            | _____                                                                     | _____ |   |
| Peer support               | 1                                                                         | 2     | 3 |
|                            | _____                                                                     |       |   |
| Motivation                 | 1                                                                         | 2     | 3 |
| Self-efficacy              | 1                                                                         | 3     | 2 |

**Note.** Tukey Procedure

aLack of Work Category: (1) 0-30 days, (2) 31-60 days, (3) 61-99 days.

Numbers for each age group are arranged by descending mean scores of each of the five factors. A common underline connects groups for which the HSD analysis detected significant differences.

**Exhibit 18****Tukey HSD Procedure for Comparisons of TTI Factor Means for Variable of Time Format of Related Classroom Training**

| TTI factor                 | Time format of related classroom training category <sub>a</sub> |   |   |   |   |
|----------------------------|-----------------------------------------------------------------|---|---|---|---|
| Organizational environment | 3                                                               | 1 | 5 | 4 | 2 |
|                            |                                                                 |   |   |   |   |
| Supervisory support        | 3                                                               | 4 | 1 | 5 | 2 |
|                            |                                                                 |   |   |   |   |
| Peer support               | 1                                                               | 4 | 3 | 2 | 5 |
| Motivation                 | 5                                                               | 3 | 1 | 4 | 2 |
|                            |                                                                 |   |   |   |   |
| Self-efficacy              | 5                                                               | 2 | 3 | 1 | 4 |

**Note. Tukey Procedure**

<sup>a</sup>Time Format of Related Classroom Training Category: (1) One night per week, (2) Two nights per week, (3) One day per week, (4) Block release, (5) One day every other week.

Numbers for each age group are arranged by descending mean scores of each of the five factors. A common underline connects groups for which the HSD analysis detected significant differences.

## VITA

Mark Stuart Farris was born in Knoxville, Tennessee, to Harry L. Farris and Jean C. Farris. He has two brothers, John and Paul, and one sister, Leslie. He attended and graduated from Farragut High School in Farragut, Tennessee. He entered undergraduate school at The University of Tennessee, Knoxville. While pursuing a degree in Liberal Arts, he worked as a butcher at a major grocery store chain.

In 1993, he entered a master's program in Human Resource Development at The University of Tennessee, Knoxville. While enrolled in the degree program, he was awarded an internship with Martin Marietta Energy Systems (MMES) in Oak Ridge, TN. He was hired a short time later as a full-time sub-contractor employee by The University of Tennessee serving MMES at three Oak Ridge area plants. While in this position, he designed, delivered, and evaluated compliance and soft-skills training programs. While working for MMES, he completed his master's degree and enrolled in the Human Resource Development doctoral program at The University of Tennessee.

In 1999, he left the Oak Ridge reservation to pursue a consulting position with Denso Manufacturing, in Maryville, Tennessee. While there he developed a Total Industrial Engineering Curriculum for managers and workers. Later that year, he accepted a training evaluation position at The University of Tennessee, Knoxville. In this position he developed a complete social services training evaluation program for a state contractor. He based the evaluation program on Donald Kirkpatrick's four-level evaluation model.

In 2001, he resigned from his position at The University of Tennessee to devote uninterrupted time to the completion of his doctoral degree in Human Resource

Development. He received a Doctor of Philosophy degree from The University of Tennessee in December 2001.