SOLVING PERFORMANCE PROBLEMS THROUGH FIRST-LINE SUPERVISORS

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Abstract

Can a first-line supervisor improve worker performance? First-line supervisors at a facility of a manufacturing company volunteered to learn performance improvement principles and be coached in applying those principles in order to solve performance problems in the workplace. The researcher continued coaching and evaluating the performance of the first-line supervisors as the volunteers utilized action research methodology to improve worker performance. While solving performance problems, the volunteers used a job aid specifically designed to guide the first-line supervisor in solving performance problems, improving the job aid as a result of usage. Each of the first-line supervisors, prior to volunteering, had some experience as a supervisor, ranging from one year to 20 years, but had not been prepared to be a supervisor prior to assuming the position and had not been trained in performance improvement after becoming a supervisor. In solving each performance problem, the first-line supervisor analyzed performance of a worker or group of workers to determine the performance gap for the problem, identified the cause of the problem, chose an intervention to improve performance, implemented the intervention, and evaluated all of the actions taken to determine if further action was needed to improve performance. Some performance problems were solved with one intervention and others required multiple interventions to find the most effective intervention to solve the problem. Each first-line supervisor used the job aid to guide, as well as document, actions taken to solve performance problems. Each first-line supervisor also contributed to improvement in the job aid resulting from usage. Findings resulting from observation, interview, and the comments of the volunteer first-line supervisors were that: (a) learning was transferred to application by actually solving performance problems, (b) the job aid was useful in guiding first-line supervisors in solving problems, and (c) action research, in addition to being easily

understood by the supervisors, facilitated the solution of problems by providing a framework for action in solving performance problems. Further research is needed in applying the action research methodology in other organizations with a larger sample of first-line supervisors, in different locations, with different missions and goals.

Dedication

"Teachers open the door, but you must enter by yourself." -- Chinese proverb

I dedicate this dissertation to my late mother, Mary Vista Diaz Bishop, and my late father, James Anderson Bishop. A teacher of special-needs children for most of her adult life, my mother touched countless students with her devotion to teaching them to live a fulfilling life and seeing that fulfillment demonstrated in countless ways. From my mother I learned that the excitement of learning was only matched by the excitement of helping others learn. A man of unwavering integrity and limitless endurance, my father taught me the value of strength in your convictions and the patience necessary to maintain that strength in the face of adversity.

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I also owe a debt of gratitude to my brother, Dr. Phillip A. Bishop, who lent his expertise to NASA as well as more than one hundred doctoral candidates, including his brother.

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CHAPTER 1: INTRODUCTION

Introduction to the Problem

Can a first-line supervisor improve worker performance?

In many organizations, achieving organizational goals depends upon the performance of individual members of that organization. Productive performance is not based upon the behavior of an individual, but rather the accomplishment of an individual (Gilbert, 1978). And as Gilbert (1978) went on to explain, "We have no need to measure behavior until we have measured accomplishment" (p. 23). The changing environment of those organizations, whether resulting from the explosion in technology, changing workforce abilities and attitudes, or economic downturn, frequently require the organization to adapt to change while maintaining or improving productivity of workers.

The first level of management, the first-line supervisor, the person at the intersection of organizational goals and productivity of the workforce, is in a unique position to effect change in organizations. As Drucker observed in the *Wall Street Journal* on June 7, 1983, "No job is going to change more in the next decade than that of the first-line supervisor in both factory and office. And few people in the work force are less prepared for the changes …" (Drucker, 1983, p. 2). As accurate as Drucker's observation was three decades ago, the need for helping the first-line supervisor deal with change affecting the productivity of the workforce may be considered critical today.

Just as high worker productivity may be a stated goal for an organization, first-line supervisors may not be used as an important resource for achieving that goal to the extent that they could be. Drucker (2001) described the job of supervisor as a three-part task – identifying,

analyzing, and deciding how to intervene on the job to improve performance. If that is the job of a first-line supervisor, then a first-line supervisor may require help to assume that role when made a part of management.

Research by Gilbert and Chevalier, emphasize the value to the organization of focusing on performance as a means of increasing productivity (Gilbert, 1978; Chevalier, 2007). The very title of Gilbert's seminal work, *Human Competence, Engineering Worth Performance*, illustrates the value that an organization may obtain by attempting to improve performance. Chevalier (2007) emphasized that focusing on performance improvement provides an opportunity for the organization, as well as the individual, to succeed. And one way that first-line supervisors may improve their own performance is by knowing more about and using basic performance improvement principles.

Background of the Problem

While an organization can evaluate whether stated goals are being reached, the question arises: If not, why not? Achieving many of the goals of an organization may be directly linked to the ability of the members of the organization to perform their jobs competently (Van Tiem, Moseley, & Dessinger, 2012, p. xxix). Viewing an organization as a system permits analyzing what the organization takes in (the inputs), what the organization does with the inputs (process), and what the organization produces (outputs; Broad, 2005, p. 5). Determining why goals are not being met may be viewed by examining the organization as a system and determining what parts of that organization need attention. Competent performance may be defined in terms of the accomplishments (outputs) as compared to cost (inputs and process) (Gilbert, 1978, p. 23). But are first-line supervisors being viewed as a resource to realize competent job performance, the key to meeting goals?

While individual worker performance improvement may be cited as a goal for an organization, the problem of poor worker performance often is out of the control of the worker. Gilbert (1978) established a matrix of causes of poor performance, dividing the causes into two general groups of factors that are missing for the worker – environmental factors and individual factors. Environmental factors, out of the control of workers, consist of the workplace and the managers of the workplace, including the first-line supervisors. Individual factors, at least partly under the control of the worker, include such factors as motivation and effort. Gilbert (1978) believed that performance improvement could be improved by finding the missing support factors and supplying them to workers. Performance experts describe that, about four times out of five, resolution of a performance problem does not lie with the performer, but with the managers and supervisors responsible for the performance (Rummler and Brache, 1995, p. 44). This means that, if managers and first-line supervisors examine the factors that inhibit or promote good job performance, they may concentrate their efforts on reducing inhibitions to good performance and increase promoting factors for good job performance.

The first-line supervisor may tasked to make sure that stated goals are met by the individuals being supervised in an ongoing basis. In order to accomplish that task, each supervisor should also be prepared to analyze performance on a local basis and take the necessary actions to make sure that individual performance improves. First-line supervisors are not able to accomplish this task unless they know how. Preparing supervisors as performance problem solvers, using methods such as training and coaching, may help supervisors know how to improve performance.

A review of the literature supports the fact that many organizations offer no formal development program to prepare experienced or inexperienced first-line supervisors to become supervisors, with each new first-line supervisor assuming the new position with few tools to help that person perform well in the position. In "Training TOP 125 2009," in the publication *Training*, the overview for each of the 125 companies lists the types of training presented at that company and the reasons for listing each company. Of the 125 companies from throughout the world, only ten capsules or briefs included any mention of training supervision, with half of the ten capsules using the term in relation to supervisory support of technical education. The five capsules that specifically mentioned supervisory training indicated that the supervisory training was on leadership style and understanding the legal aspects of supervision. None of the five capsules referred to performance problem-solving or the value of such knowledge to supervisors. The ability to recognize, analyze, and reduce performance problems of workers is not usually a latent talent of most people, including new first-line supervisors. Further, even experienced first-line supervisors, with no knowledge or experience coping with personnel performance problems, may be ineffective in improving workplace performance.

This organizational development problem has been identified at the Light Manufacturing Company (pseudonym). The premise of this qualitative action research study is that first-line supervisors at the Light Manufacturing Company (pseudonym) can be trained in the basic concepts of performance improvement and coached in the application of the knowledge to improve worker performance. Analyzing the organization as a system and identifying the stakeholders, those most affected by the improvement, are used as a means of performance analysis. The Performance Improvement/Human Performance Technology Model and the Behavior Engineering Model are used as a knowledge basis to increase the problem solving

ability of first-line supervisors. Coaching in use of the knowledge helps in transfer of that knowledge to use on-the-job. A job aid, the Performance Problem Tool, based on performance improvement principles, is used by first-line supervisors to solve performance problems as a part of the action research. These concepts are developed in the Review of Literature, Chapter 2 of this research study.

Statement of the Problem

Many organizations, in order to reach stated goals and missions, rely on the individual efforts of members of that organization. When performance of any member is not sufficient, a performance problem may exist. One under-utilized resource to address in the problem of performance improvement may be the first-line supervisor. By being able to recognize, analyze, and then facilitate the correction of performance problems, first-line supervisors can become a more valuable part of management. The purpose of performance improvement is not to "fix" employees, but to "develop" them (Chevalier, 2007, p. 2). The research problem is to determine how first-line supervisors at Light Manufacturing Company (pseudonym), taught the basic principles of performance improvement and coached in the application of those principles, can apply that knowledge and skill to improve performance of workers.

Purpose of the Study

The purpose of this study is to determine how first-line supervisors at Light Manufacturing Company (pseudonym), trained in basic principles of performance improvement and coached in applying the principles, can improve performance of workers. Improvement was valued by Deming (1983) and included in his 14 points as his fifth point: "Improve constantly and forever every process for planning, production, and service" (p. 23). Observing and

implementing this point requires a great deal more effort from all members of an organization, including the first-line supervisor.

Research Question

This qualitative research study using action research addresses the following research question that focuses on the influence of knowledge of and coaching of first-line supervisors in performance improvement on workers at the Light Manufacturing Company (pseudonym):

> How do first-line supervisors implement training and coaching in the basic principles of performance improvement in order to solve worker performance problems?

Rationale, Relevance, and Significance of the Study

Rationale

This study is needed because it examines how a specific level of management, the first-line supervisor, can improve performance, after training and practice in applying the basic principles of performance improvement. If knowledge of and use of performance improvement principles, such as the Performance Improvement/Human Performance Technology Model and the Updated Behavior Engineering Model, which have been successfully used by performance improvement professionals, become part of the knowledge base of first-line supervisors, then possibly these newly-trained supervisors will have a framework of knowledge and skill to solve performance-related problems. As Brinkerhoff (2006) stated:

> …what if we could demonstrate – with convincing evidence – that a person really did learn something new, that they really did use this learning in some important job application, and that this job application led to a worthwhile outcome; would we not have a credible and defensible instance of impact from training? (p. 9).

An example of the use of the Performance Improvement/Human Performance Technology Model and the Updated Behavior Engineering Model by a first-line supervisor to improve performance, with a resultant increase in worker productivity, may be viewed as an example of the value of the enhanced knowledge and skills of that first-line supervisor.

This study developed from a combination of (a) review of the literature on performance improvement, preparation of supervisors for their role in organizations, and business coaching and (b) perception of the potential value of having the member of management most closely associated with the worker and the workplace attempting to solve worker performance problems. For example, Andia (2008), manager of leadership and management training at a large manufacturing company, describes a training program based upon the Behavior Engineering Model developed for and used at one large manufacturing firm. While the emphasis of the training described was not specifically for first-line supervisors nor was the training intended for initial training of supervisors, the article did plant the seed for research into direct training and coaching as part of the preparation of first-line supervisors to become performance problem solvers. Further, Chevalier, a leader in the human performance improvement field, in addition to developing the Updated Behavior Engineering Model, has been teaching management personnel in industry and government for many years to become better problem-solvers in order to improve performance in the workplace. This research specifically focuses on helping one level of management, the first-line supervisors, to become good performance problem-solvers.

An inherent goal of research in this project is the development of a job aid for use by first-line supervisors to help them analyze and solve performance problems. Chevalier (2008) described the development of a specific, multi-part analysis worksheet based upon the Performance Improvement/Human Performance Technology Model and the Behavior

Engineering Model for use in the nuclear industry. A similar job aid, the Performance Problem Tool (shown in an abbreviated form in Figure 1), using the nuclear model as a basis, was developed for use by participating first-line supervisors in this research study. A goal of this research is to modify the initial version of this job aid as a result of use by first-line supervisors in the research. In turn, job aids may then be adapted for other organizations and applications as needed in those organizations.

Observed Problem Description
Desired Performance Description
Environmental Factor(s) Selection
Actual Performance Description
Performance Gap Estimate
Problem Cause Analysis (BEM)
Intervention Selection and implementation
Evaluation – Did Intervention Reduce Gap? Why?

Figure 1. Abbreviated Form of Performance Problem Tool (Developed by author)

Another major goal of this research is to demonstrate that, if knowledge and tools for performance improvement can be utilized by first-line supervisors to help workers improve performance, then a definitive addition to the field of education can be made, especially in the field of training and performance improvement. In addition, action research as a means to facilitate transfer of training knowledge may be studied directly. Further, analysis of the research data for validity and transferability of the methodology may show the applicability of the results to other supervisors in similar settings. Analysis of the study could also establish the potential for use of the knowledge gained through the research as a template for performance improvement by management personnel in different parts of the research organization or other organizations.

Relevance

This study is relevant to the field of training and performance improvement because principles of performance improvement used by practitioners in this field were taught to first-line supervisors. These principles were then used by the supervisors to solve actual performance problems encountered in the workplace by means of action research. In the process of solving performance problems using a job aid, the type of job aid that might be used by many organizations as a template to determine the appropriate job aid for use in that organization in performance problem solving.

Significance

This study of performance problem-solving by first-line supervisors of Light Manufacturing Company (pseudonym) and the resulting change in performance is significant because it concentrates on actions in applying knowledge by a specific level of management in the workplace. Even though evidence can be found in the literature of training in performance improvement of many levels of management within the classroom, no published evidence could be found, even after extensive research of the literature, for training and coaching as action science in the transfer of knowledge of first-line supervisors in order to improve worker performance. In addition, using a job aid for performance improvement developed by Chevalier (2008) for use by supervisors in the nuclear power industry, this study will modify the basic design of this job aid, the Performance Problem Tool (shown in abbreviated form in Figure 1), for the Light Manufacturing Company (pseudonym) through the use of a resource that has been tested and improved by use of first-line supervisors in the workplace.

This study will aid in closing the gap in knowledge related to application of performance improvement principles by a specific level of management in the workplace. While the literature

reveals research into the content of supervisor training and the ways and means to increase performance, this study will extend this research to study training and coaching first-line supervisors in improving worker performance. The American Society for Training and Development (2005) reported on the expenditure of vast sums of money on training in the United States (over 109 billion dollars in 2005, for example), Yet only a tiny fraction of that amount appears to be devoted to supervisor training and learning as performance problem-solvers.

For many years, the Performance Improvement/Human Performance Technology Model and the Behavior Engineering Model have permitted a methodical examination of both the environment of a job or task and the performance of an individual within that environment, in a coordinated manner. According to Rothwell, Hohne, and King (2007), the Behavior Engineering Model assesses the effects of information, resources, and motivation due to the environment on individual performance and further assesses the resulting information, instrumentation, and motivation that the individual brings to that environment. The Performance Improvement/Human Performance Technology Model "…is a diagnostic and strategic tool for increasing workplace performance" (Van Tiem, Moseley, & Dessinger, 2012, p. 41). Both the Performance Improvement/Human Performance Technology Model and Behavior Engineering Model have been, and remain, valuable tools for use *by professionals* in training and performance improvement. But because this study combines the elements of both of the models for use *by first-line supervisors*, it can be used as a lens through which the most important functions of a first-line supervisor may be viewed.

Knowledge produced as a result of this study may contribute to and refine existing theory and research in worker performance improvement by answering questions related to the first-line supervisors of the Light Manufacturing Company (pseudonym), such as:

- Exactly what types of problems do first-line supervisors typically encounter that would require performance improvement skills?
- Would knowledge of the basic concepts of the Performance Improvement/Human Performance Technology Model and the Behavior Engineering Model provide a first-line supervisor the framework for analysis of personnel performance problems?
- Could first-line supervisors use the knowledge and experience gained as part of a comprehensive approach to identify problems and develop solutions to worker performance problems encountered as part of normal supervision and leadership in the facility?
- Can tools be developed that will assist first-line supervisors in applying the Performance Improvement/Human Performance Technology Model and the Behavior Engineering Model in defining performance gaps, underlying causes, and potential courses of action?

The findings from this study should help other organizations, whether in business or government, design performance improvement plans that include training and coaching in the Performance Improvement/Human Performance Technology Model and the Behavior Engineering Model as well as designing and using job aids to solve performance problems that are specific to the organization. Stringer (2014) stated:

> Far from providing a set of fixed prescriptions to be applied in any context, action research provides a flexible and practical set of procedures that are systematic, cyclical, solutions oriented, and participatory, providing the means to devise sustainable improvements in practice that enhance the lives and well-being of all participants (p. 5).

This study may also lead to further empirical study of worker performance improvement by first-line supervisors in other organizations as well as provide a starting framework for such studies.

Nature of the Study

The nature of this study can be best described by a statement by Coghlan and Brannick (2010) in defining action research: "As an approach to problem solving, it is an application of the scientific method of fact-finding and experimentation to practical problems requiring action solutions and involving the collaboration and cooperation of the action researchers and members of the organizational system. The desired outcomes of the action research approach are not just solutions to the immediate problems but important learning from outcomes both intended and unintended, and a contribution to scientific knowledge and theory" (p. 5). This qualitative research study utilizing action research was developed in order to examine how first-line supervisors, trained in basic performance improvement principles and coached in application of the knowledge, can use that knowledge and a job aid to improve worker performance. Participating first-line supervisor were taught basic performance improvement principles and then coached in application of the knowledge. As a part of the action research, the first-line supervisors then utilized the knowledge and skills attained to solve actual performance problems in the workplace. A job aid, the Performance Problem Tool, was improved by the actions of first-line supervisors in improving worker performance during the research.

The research plan for this study also used the principles of transfer of learning through coaching to help first-line supervisors establish and test a knowledge base of performance improvement principles. Broad and Newstrom (1992) defined transfer of training: "Transfer of training is the effective and continuing application, by trainees to their jobs, of the knowledge and skills gained in training – both on and off the job" (p. 6). The objective of coaching is to

help people change (Bacon & Spear, 2003). Thus observation and reporting of transfer of learning, with coaching as an integral part of the transfer process, led to analysis of the action research.

Experiential training was utilized in helping prepare supervisors to understand the Updated Behavior Engineering Model as applied to reducing performance problems through use of the job aid. As a part of the preparation of each supervisor, examples and simulations of typical problems were utilized. The supervisors were trained, coached, and then observed making use of the job aid. Of particular importance was how each supervisor could transfer knowledge and skills attained through experience to solve actual performance problems encountered to provide context for coaching.

Definition of Terms

Several terms are used throughout this research and should be defined in order to clarify the research. The major areas of definitions are: Light Manufacturing Company (pseudonym), human performance technology, and research-related terms.

Light Manufacturing Company (pseudonym) Terms.

Associate – any employee of the organization. This term is generally applied to any workers that do not fill a management position.

Manager – each person assigned to a facility for management of facility workers and supervisors. Drucker defined a manager in terms of "its task to make people capable of joint performance, to make their strengths effective and their weaknesses irrelevant" (Drucker, 2001).

Supervisor – any first-line management (entry management level) personnel assigned to supervise facility workers. Personnel who "are responsible for getting work done through people" (Cremo & Felix, 2000, p. 1).

Human Performance Technology Terms.

Behavior Engineering Model (BEM) – Thomas F. Gilbert (1978) explained in detail how the Behavior Engineering Model is the matrix that permits us to "order our thinking about how we can alter performance through changes in behavior" (p. 83). Gilbert also argued that the Behavior Engineering Model is a "performance troubleshooting sequence" (p. 91).

Cause Analysis – determining the cause of a performance gap. Van Tiem, Moseley, and Dessinger (2012) argued that "a cause analysis determines why the performance gap exists" (p. 163).

Exemplary Performer – a performer producing output at or near the optimum level for a particular job. Gilbert (2007) defined "exemplary performance as the worth of the historically best instance of the performance" (p. 30).

Human Performance Improvement (HPI) – a process of increasing the productivity of individuals. Rosenberg (1998) argued that performance improvement "reflects the goals or benefits of the performance improvement process" (p. 6). Van Tiem, Moseley, and Dessinger (2012) defined "Performance improvement (PI), also known as performance technology (PT), human performance technology (HPT), or human performance improvement (HPI), is the science and art of improving people, process, performance, organizations, and ultimately society" (p. 5).

Human Performance Technology (HPT) –Rosenberg (1998) asserted that human performance technology is the "process and tools we use to solve human performance problems or to realize performance-improvement opportunities" (p. 6). Performance improvement is the end while performance technology is the means. (R. Chevalier, personal communication, September 14, 2012)

Intervention – a means to promote change. "Interventions, quite simply, are proposed solutions to address the gaps identified in an organization" (Van Tiem, Moseley, & Dessinger, 2012, p. 46).

Intervention Selection – choosing what to do in order to improve performance. "Intervention selection is the process of identifying…the most appropriate activities to successfully resolve a performance improvement problem, opportunity, or challenge" (Van Tiem, Moseley, & Dessinger, 2012, p. 197)

Off-the-Shelf – product that is not custom-made

Performance – the work output or result of an individual or group, both the activity and the result. Performance is defined by Broad (2005) as: "At the individual, group, and team performer levels: A combination of behaviors by individuals, groups, and teams and the results or accomplishments that they produce…" (p. 233).

Performance Gap – difference between actual performance and exemplary (desired) performance. Chevalier (2008) explained in detail that a performance gap is "the difference between 'where we are' (the present level of performance) and 'where we want to be' (the desired level of performance)" (p. 9).

Performance Gap Analysis – determining the difference between the actual level of performance and the desired level of performance. Van Tiem, Moseley, and Dessinger (2012) insisted that "the purpose of performance gap analysis is to identify present and future gaps between the desired performance state and the actual performance state" (p. 158).

Performance Improvement – "Performance improvement…is both the process of making performance better and the actual positive result of the performance improvement process" (Van Tiem, Moseley, & Dessinger, 2012, p. 6)

Performance Improvement / Human Performance Technology (PI/HPT) Model – a template for use to effect performance improvement. "The Performance Improvement / HPT Model is a diagnostic and strategic tool for improving workplace performance because it is a thoughtful, evidence-based approach" (Van Tiem, Moseley, & Dessinger, 2012, p. 41)

Performance Problem – when a worker *is not* doing what they *should be* doing (Mager & Pipe, 1997, p. 1). Performance problems can range from chronic absenteeism to failure to follow safety procedures, from repeated errors in operation or maintenance of equipment to causing friction between employees, from ethical misconduct to excessive lost-time accidents.

Performance Problem Tool – job aid developed by the researcher as part of this research project to help supervisors in knowledge and skills in performance problem-solving. The Performance Problem Tool used in this study was developed from the Performance Improvement/Human Performance Technology Model presented by Van Tiem, Moseley, and Dessinger (2012), the Updated Behavior Engineering Model presented by Chevalier (2007), and personal communication by the researcher with D. Van Tiem and R. Chevalier.

Stakeholder – an individual who gains directly from the improvement in performance of one or more other individuals. Broad (2005) argued that a stakeholder in a system is "an individual, group, or organizational component, or organization with a share or interest – a stake – in the goals or operations of an activity, process, project, organization, or intervention in a complex system" (p. 7).

Updated Behavior Engineering Model (BEM) – Gilbert's Behavior Engineering model was updated by Chevalier (2003) to provide more information for ease of understanding and use of each part of the Behavior Engineering Model.

Research-Related Terms.

Action Research – A method of qualitative research originated by Kurt Lewin (1946) as "a comparative research on the conditions and effects of various forms of social interaction, and research leading to social action" (p. 144). Action research was defined by Coghlan and Brannick (2010) as "research *in* action, rather than research *about* action" (p. 4). Action research was defined by Stringer (2014): "Action research is a systematic approach to investigation that enables people to find effective solutions to problems they confront in their everyday lives" (p. 1).

Action Science – a method of research inquiry defined by Argyris, Putnam, and Smith (1985) as "moves into both familiar and unfamiliar domains of inquiry in the problems it sets and in the solution it seeks" (p. 236).

Artifacts – any materials that describe and inform research that may not appear to be directly related to the research or do not exist prior to the research. Merriam (2009) defined artifacts, for research purposes, as: "'things' or objects in the environment differentiated from documents that represent some form of communication (e.g., official records…)" (p. 139)

Coaching – a form of training focusing on the performance of an individual. According to Bacon and Spear (2003), coaching is the focal point of the person's performance (p. 10).

Data – quantified information, statistics

Experiential Learning – using actual experience of the learner in order to help the learner make use of the knowledge gained. Experiential learning can also be called on-the-job training.

Primary Stakeholders - the first-line supervisors, the facility management, and the personnel supervised. Personnel most affected by change in a complex organization. Combs

and Falletta (2000) asserted: "A stakeholder is anyone who is directly or indirectly affected by an HPI intervention or evaluation" (p. 15).

Qualitative Research – examination of a specific event, person, or group in depth. Borg, Gall, and Gall (1993) described the purpose of qualitative research is to "…develop an understanding of individuals and events in their natural state, taking into account the relevant context" (p. 194).

Reliability – likelihood of repeat of the research with similar results. Swanson and Holton (2005) asserted that: "The goal of reliability is to minimize the errors and biases in a study" (p. 340).

Transfer of Training – application of principles presented in training to the workplace. Lee (2010) stated: "Transfer is defined as the on-the-job application of skills and knowledge gained in training" (p. 182)

Triangulation – in nautical terms: determining location using three viewpoints to the location. Ma and Sherwood (2007) described in detail that the purpose of triangulation in research is "to increase the validity of a study by seeking the degree of agreement in the investigation outcome from the use of multiple methods and measurement procedures" (p. 211).

Validity – measurement result is based upon measurement premise, or what you measure is what you said you would measure. Swanson and Holton (2005) described testing for validity through "establishing correct operational measures for the concepts being studied", "establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships", "establishing the domain to which a study's findings can be generalized", and "reliability" (p. 339).

Assumptions, Limitations, and Delimitations

Assumptions, limitations, and delimitations apply to this study.

Assumptions

The following assumptions were made:

- First-line supervisors to be studied have received no training as preparation to become a first-line supervisor, with none of the first-line supervisors having been made aware of or having been trained in the Performance Improvement/Human Performance Technology Model or the Updated Behavior Engineering Model, except by the researcher.
- First-line supervisors have sufficient knowledge of the equipment being operated and the safety principles expected to be known by workers to provide a basic level of supervision.
- The anonymity of participating first-line supervisors, managers of those supervisors, and workers reporting to those supervisors will be maintained.
- Participating first-line supervisors have the right of withdrawal from participation in any part of the study and will acknowledge this right in writing.

Limitations

The following limitations were recognized in the research:

- Only a limited amount of time and money was available for conducting action research with first-line supervisors as participants.
- A relatively small sample of first-line supervisors from one organization form the group of participating first-line supervisors. Interviews with management personnel at the facility at which research was conducted included specific

questions to aid in mitigating this limitation. Not only was the population from which a sample was taken small, but, as stated by Deming (1944), "Sampling errors, even for small samples, are often the least of the errors present." (p. 366).

- Difficulty in isolating the change in behavior of the workers being supervised by participating first-line supervisors from any other changes in behavior of the workers not directly linked to this research. Workers supervised by participating first-line supervisors may improve, but in a manner not directly caused by the intervention. Any possible improvements in worker performance, such as decrease in lost-time accidents or reduced job performance errors, for example, may be attributable to the actions of the participating first-line supervisors. The actual reasons for the organizational improvements may not be directly attributable to the research.
- As stated by Stringer (2014): "Action research therefore is based on the proposition that generalized solutions, plans, or programs may not fit all contexts or groups to whom they are applied and that the purpose of inquiry is to find an appropriate solution for the particular dynamics at work in a local situation" (p. 6).

Delimitations

The following delimitations of the scope of the study were recognized by the researcher:

- Some data relevant to the research may have been lost because a single researcher observed more than one first-line supervisor and could not devote full-time observance to any individual supervisor.

- This study concentrated on a part of the Light Manufacturing Company (pseudonym) and does not directly apply to any other first-line supervisor within the Light Manufacturing Company (pseudonym) or any other supervisor at any other organization.

Organization of the Remainder of the Study

The remainder of this study examines the literature to reveal both traditional preparation for supervisors as well as how this preparation might be modified to provide supervisors the tools needed to become better performance problem-solvers. Chapter 2 presents the theoretical framework for the proposed study, by presenting, analyzing, synthesizing, and critiquing the appropriate literature related to the research problem described in Chapter 1. Chapter 3 describes the research methodology selected to respond to the problem and answer the research questions. Once the collection of data and artifacts was completed, Chapter 4 presents an analysis of the data, artifacts, and action research. The completed results of the research study concludes with Chapter 5, which includes (a) a summary of the findings, (b) the conclusions drawn from the analysis presented in Chapter 4, (c) the implications for practice, (d) the relationship of findings to the literature review, and (e) the recommendations for practice and future research.

CHAPTER 2: REVIEW OF LITERATURE

Research Question

This qualitative study utilizing action research addresses the following research question that focuses on the influence of knowledge of and coaching of first-line supervisors in performance improvement on workers at the Light Manufacturing Company (pseudonym):

> How do first-line supervisors implement training and coaching in the basic principles of performance improvement in order to solve worker performance problems?

Literature Review Plan

The Review of Literature permits exploring the research question with regard to performance problem-solving by supervisors and focuses on topics essential to understanding the research. Creswell (2009) described the objectives of the literature review, stating that, "The literature review accomplishes several purposes. It shares with the reader the results of other studies that are closely related to the one being undertaken. It relates a study to the larger, ongoing dialogue in the literature, filling in gaps and extending prior studies…It provides a framework for establishing the importance of the study as well as a benchmark for comparing the results with other findings" (p. 25). This literature review is based upon those objectives.

One method of literature review suggested by Creswell (2009) is the literature map. The literature map is a framework built upon the major subjects of the research questions in this study and presents them as topics. This literature review map for this study surveys nine major topics that form the foundation for this research: (a) organizations as systems (b) supervisors and problem-solving, (c) Performance Improvement and the HPT Model, (d) Behavior Engineering Model, (e) business coaching, (f) experiential learning, (g) transfer of learning, (h) qualitative

research, and (i) action research. The literature contains studies and research that are a basis and starting point for this research and permit answering many performance improvement questions.

Understanding the position of the first-line supervisor in an organization, as well as the effect on stakeholders of the actions taken by supervisors, become apparent by treating an organization as a system. Organizational and performance improvement experts contributed to the understanding of the vital role supervision has in productivity. Drucker (1983, 1993) and Deming (1983), renowned experts on business, identified many of the skills and knowledge needed by supervisors. Van Tiem (2012) and Chevalier (2007) described the HPT methodology and how to apply the methodology to analyze and reduce performance problems. Gilbert (1978) developed the Behavior Engineering Model through study and understanding of the workplace environment as well as the personnel performing in that workplace. Chevalier (2007) adapted and expanded the Behavior Engineering Model to develop the Updated Behavior Engineering Model. Broad (1992) and other experts developed techniques to create higher levels of transfer of training to use on the job, such as by inclusion of stakeholders in planning the content of interventions such as training.

The literature contains many references to research methodology, including qualitative research and use of action research in a qualitative study. The principles of triangulation permit analyzing data and artifacts collected from different views to refine and validate evaluation of data. These and other leading thinkers and many studies based upon these principles provided a rich source of information to use in this research project. The sources of information for this literature review include published works of experts in organizational problems as well as organizational success, experts in performance improvement principles and applications, and experts in research principles and methodologies. Published work sources include printed copies

and Capella University Library databases (such as Business Source Complete, ABI/INFORM Global, and Academic Search Premier). Other electronic sources were searched for relevant information, such as the International Society for Performance Improvement website (www.ISPI.org), the ASTD website (www.astd.org), and Google Scholar. Personal communication by phone and email with experts in performance improvement as well as experts in research at the Capella Research Center were used to inform and clarify principles identified and utilized in this research.

Theoretical Framework

This qualitative study of using action research in the form of teaching and coaching first-line supervisors in the basic principles of worker performance improvement was an intervention to study how first-line supervisors can improve worker performance in a part of Light Manufacturing Company (pseudonym).

This research concentrated on one part of the management of an organization, the first level of that management, the first-line supervisor. The first-line supervisor is the level of management that has direct contact with the staff, the worker, usually on a frequent basis. Many experts on organizational management have, for generations, observed the performance of supervisors and evaluated how supervisors manage workers. Drucker (1983) observed that with the advent of automation and the changing freedoms of workers, the requirements of a supervisors had changed and "we need a stronger, more confident, more responsible supervisor" (p. 1). This research proposes a process whereby supervisors may become stronger in one important part of supervisory development, the knowledge and skills necessary to help workers improve performance.

Organizations as Systems

A working definition of an organization was given by Broad (2005) "Organizations are systems with interrelated components that take in resources (inputs), apply some work (process), turn out products and services (outputs), and respond to internal or external factors by changing these inputs, processes, or outputs" (p. 5). By defining and understanding an individual system and the relationship of sub-systems to each other, the beginning of a front-end analysis of work performance becomes possible. Rummler (2007) used the view of organizations as systems to develop the Anatomy of Performance to use in performance analysis. The fundamental parts of the Anatomy of Performance are:

1. Organizations are systems.
2. Organizations are processing systems.
3. Organizations are adaptive systems.
4. Jobs or roles and functions exist to support the processes of the organization.
5. All performers are part of a human performance system (HPS).
6. Management must keep the organization system aligned.
7. The results chain must link to a critical business issue. (p. 17)

Rummler succinctly expressed not only the importance of viewing organizations as systems, but also the framework for analyzing performance.

Some parts of the organization may be considered *stakeholders*. A member of an organization is a stakeholder if that member has a vested interest in a specific outcome. The stakeholder should be considered when making any change to an organization, because the stakeholder may be significantly affected by that change. Stakeholder support is necessary, and included in this study, in the beginning for the implementation of the instructional intervention in

performance improvement principles and then afterwards to perpetuate the use of the knowledge of problem-solving to help workers increase performance.

Supervisor Preparation

Understanding the environment and the reaction of the worker to that environment are keys to improving the performance of that worker. One person who might be able to determine the performance of a worker and the environment in which that worker performs is normally the first-line supervisor of that worker. The supervisor, regardless of level, should be capable of identifying that a performance gap exists, measuring the difference between the existing and desired levels of performance, identifying underlying causes, selecting interventions that will address these causes, implementing the interventions, and evaluating the results of intervention. This process requires not only technical knowledge of the environment and worker, but also the ability to evaluate the gap, implement an intervention, and then measure the effectiveness of the intervention, both in tangible as well as intangible terms.

Preparation of first-line supervisors to assume the role of problem-solver and performance improver requires the supervisor, especially the new supervisor, to increase both knowledge and skills. For many organizations, the preferred method of preparation of supervisors is classroom training, thought by many managers to be the most economical intervention to accomplish preparation of supervisors. Yet as Broad and Newstrom (1992) explained, "Training is expensive to design and deliver; it should be the last, not the first, intervention the…organization should consider in order to improve employee performance" (p. 5). If only classroom training is used to prepare supervisors, important elements of training may not be included. An important element that could be included is increasing the knowledge and skills of supervisors in ways to aid employees to become exemplary performers by identifying

and eliminating impediments to good performance. While a supervisor should possess technical knowledge of the work environment and personal expertise in performance of workers in each position supervised, that knowledge alone is often the basis of selection of the individual to become a supervisor. But often overlooked by management in selecting the supervisor are skills in analyzing performance problems, creating interventions to close the gap, and implementing those interventions to permit each person being supervised to close their performance gap. This study was intended to develop these skills in participating first-line supervisors, supplying the part overlooked.

Performance Improvement/Human Performance Technology Model

The Performance Improvement/Human Performance Technology Model is a systematic approach to gaining improvement in performance of individuals as well as the organizations of which the individuals are a part. The major elements of the Performance Improvement/Human Performance Technology Model are (a) performance analysis of need or opportunity for improvement, (b) selection of one or more interventions based upon the performance analysis, (c) implementation of the intervention(s), and (d) evaluation of all phases of the activity of the Model (Van Tiem, Moseley, & Dessinger, 2012, p. 43). The initial design of the Performance Problem Tool, the job aid used in this study, was based upon this Model.

Updated Behavior Engineering Model (BEM)

For many years, the Behavior Engineering Model (BEM) has permitted a methodical examination of both the environment of a job or task and the performance of an individual within that environment, in a coordinated manner. As described by Rothwell (2007), the Behavior Engineering Model assesses the effects of information, resources, and motivation due to the environment on individual performance and further assesses the resulting information,

instrumentation, and motivation that the individual brings to that environment. The Behavior Engineering Model has been and remains a valuable tool for use by professionals in training and performance improvement. But the elements of the Behavior Engineering Model can very well be used as a lens through which the most important functions of supervisors may be viewed.

Business Coaching

Coaching is a type of intervention that is increasingly used as a method of improving employee performance (de Janasz & Sullivan, 2004). Bacon and Spear (2003) defined coaching: "Coaching is intended to improve skills and ultimately workplace performance" (p. 9). In addition, Bacon and Spear (2003) also described the directive coach: "Directive coaches believe that they help best by teaching and advising; by sharing their knowledge, experience, and perspective; and by observing others perform and giving feedback and corrective suggestions on what they've observed" (p. 87). The directive coach is an appropriate coaching style for a first-line supervisor.

One type of coaching, called adaptive coaching, is particularly suited to this research with supervisors. The essential elements of adaptive coaching are (a) determining the client's needs, (b) determining the client's preferences for coaching, (c) listening to and questioning the client, (d) sharing observations with the client, and (e) encouraging the client by pushing and pulling to obtain objectives (Bacon & Spear, 2003). Adaptive coaching is not only a manner in which supervisors can be helped in applying knowledge to actual performance problem. It is also a skill that supervisors may use in other ways to increase communication and teamwork with workers and other supervisors.

Experiential Learning

Experiential learning is learning that occurs based upon the experience of the learner. According to Kolb, Boyatzis, and Mainemelis (1999), the term experiential learning helps to "emphasize the central role that experience plays in the learning process" (p. 2). This research combines experiential learning of supervisors to recognize performance problems, coaching, and intervention to improve performance, or close the performance gap, in the form of on-the-job training, or OJT. Experiential training is valuable to transferring the knowledge to use on the job.

Transfer of Learning

One of the largest challenges facing anyone who desires to increase performance in the workplace is whether any knowledge or skills gained in an intervention, such as training, is actual use of the knowledge or skills gained in the workplace. A number of different literature searches and research efforts supported the view that training was not transferred as was commonly assumed up until the 1950s. Training will have little chance of success if not supported by the manager and the work environment (R. Chevalier, personal communication, September 24, 2012). The most commonly used training evaluation device is Kirkpatrick's four-level framework: (a) reaction and satisfaction, (b) extent of learning, (c) job performance, and (d) organizational results. (Kirkpatrick & Kirkpatrick, 2006) Level 3 is transfer to the job and level 4 is how well learning was transferred. Work by Phillips and Phillips (2007) resulted in a fifth level, return on investment (or ROI) being included to quantify the performance improvement, if possible. Transfer of learning was observed and evaluated to form a basis for adaptive coaching during this study.

Action Research

Action research facilitates the transfer of training to the job and also permits refinement of the performance improvement job aid, the Performance Problem Tool (Appendix A). By teaching and then coaching first-line supervisors in principles of performance improvement, the participants could increase their skills at worker performance improvement by their own actions. In addition, improvement in the job aid, the Performance Problem Tool (Appendix A) occurred as a result of actions of the participating first-line supervisors.

Organizations as Systems

The first-line supervisor is a part of management of an organization. A working definition of an organization was given by Broad (2005) "Organizations are systems with interrelated components that take in resources (inputs), apply some work (process), turn out products and services (outputs), and respond to internal or external factors by changing these inputs, processes, or outputs" (p. 5). Systems in turn are part of bigger organization (bigger systems). In addition, systems are made up of smaller systems units, each subsystem having a level of complexity. A system might be part of another system in many ways, including by time, by organization, or by culture. An organizational unit, such as a facility, can be viewed as part of the larger organization and interconnected to other units. Within an organizational unit, individual groups are subsystems, with a complex relationship between members of a particular group and also between other groups that make up the facility. Culturally, systems consist of managers, first-line supervisors, workers, contract laborers, and many other individuals. By defining and understanding an individual system and the relationship of systems to each other, the beginning of a front-end analysis of work performance becomes possible. For this study, the first-line supervisor is considered to be the first level of management of the organization being

studied and the actions of each of those supervisors has direct impact on other members of the organization.

Stakeholders

Some parts of the organizations may be considered *stakeholders*. A member of an organization is a stakeholder if that member has a vested interest in a specific outcome. Not all parts of an organization are stakeholders for all other parts. Diagramming a complex system, such as facility, reveals the role of the stakeholders. While a complex diagram, such as the Anatomy of Performance by Rummler (2007), is beyond the scope of this research, such a diagram would readily illustrate the primary stakeholders – the first-line supervisors, other members of the facility and organization management, and the personnel supervised.

Internal influences in an organization unit, such as a facility, are typical of those influences found in any organization. For example, operations personnel and maintenance personnel often interact to make equipment operate safely and efficiently. Equipment failure between the two areas can lead to poor performance by both the organizational units. In general, poor performance by any part of a complex organization can, and does, affect the performance of any other part of that organization, with the severity of the effect dependent upon the depth and width of the particular influence. While an exemplary level of performance is desired by management, the case can be made that exemplary performance, if attainable, is also the goal of an individual.

The stakeholder should be considered when making any change to an organization, because the stakeholders may be significantly affected by that change. Each change plan should be devised, implemented, or evaluated with consideration of stakeholders involved. Stakeholder support is necessary in the beginning for the implementation of the intervention and then

afterwards to perpetuate the use of the knowledge attained. The literature reveals the importance of stakeholder *buy in* on the success of any organizational change initiative. Primary stakeholders include executives and upper-level managers on the strategic level as well as operational managers, supervisors, and performers on the operational level (Broad, 2005, p. 31). These primary stakeholders may or may not have authority over the performers. In addition, the success of the intervention might reduce cost as well as increase the morale of affected individuals, an intangible result. The stakeholder map can help to identify these stakeholders with no direct authority over an intervention as well as the personnel for which the intervention is implemented.

Other stakeholders are not considered primary stakeholders, but may be secondary stakeholders. Secondary stakeholders should also be included in the planning and implementation phases of an intervention for several reasons. One reason these other stakeholders are important to consider is that the person may be a user, who will continue to use the products of the organization to supply the operating funds necessary to sustain operation or profit of the organization. Another reason is that other stakeholders might readily support an intervention if well-explained before implementation, but readily oppose an intervention that was deemed by the stakeholder to cause harm to them, directly or indirectly. Another stakeholder could have regulatory power over the organization, with the ability to restrict or prohibit an intervention if that intervention does not meet the letter or spirit of the regulations governing the activity undergoing change. Yet another stakeholder of interest in the planning stages could be a community-based organization that might directly or indirectly benefit from any intervention.

Stakeholders may be supportive of or opposed to any intervention. In addition, the level of support or opposition may also vary between stakeholders. A stakeholder map for an

intervention may help to reveal which stakeholders might oppose or support an intervention to improve performance and the relative degree to which each supports or opposes. Broad (2005) created a table of factors that support performance in a complex system, with all six factors being necessary to perform effectively:

Table 1.

Factors That Support Performance

Factor	Description	Responsible Stakeholders
Clear performance specification	Outputs, standards, and results for performers to attain	Managers and Supervisors
Necessary resources and support	Signals to act, priorities, tools, information, responsibility, lack of task interference, practice opportunities and other support	
Appropriate consequences	Recognition, rewards, incentives that are meaningful to performers	
Timely and relevant feedback	Timely, relevant, specific information on how well performance meets specifications	
Individual capability	The right person in the job: physical, mental, emotional abilities to perform	
Necessary skills and knowledge	Ability to perform effectively, based on experience, coaching, or learning	Managers and Supervisors, Performers, Performance Consultants

From *Beyond transfer of training: Engaging systems to improve performance,* by Broad, M. I., 2005, Silver Spring, MD: ISPI. Copyright 205 by the International Society for Performance Improvement. Reprinted with permission.

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Two important inferences can be drawn from Table 1. Notice that managers and supervisors are responsible for all six factors, with others only responsible for the last factor. Thus the success of any actions taken to improve an organization or to change the organization in any way, are much more highly influenced by the managers and supervisors than the performers. For example, if a change in an organization, such as re-organization or training program or change in operating philosophy is to be undertaken, the supportive roles taken by the supervisors and managers in areas such as providing feedback about the change or providing necessary resources for implementation depend upon the primary stakeholders. Further, the first four

factors support a good work environment, the fifth factor helps to ensure that a person with the requisite skills for the job is in the performer's role, and the sixth factor helps to ensure that the performer is trained to be effective as a performer. These factors have a recognizable parallel to the Updated Behavior Engineering Model. Because of this parallel and the importance of the primary stakeholders, involvement and support of primary stakeholders in performance improvement has influence in the success of a change. Transfer of learning to the workplace is similarly affected by the support of the primary stakeholders.

Support by Stakeholders

A great deal of evidence can be found of support by stakeholders of performance following training. In the first known doctoral dissertation on transfer of training to the job, Broad (1982) described how about seven dozen ASTD chapter presidents listed a large number of actions that would support transfer of training to the job. These support actions included support before, during, and after a training intervention. The results reported by various authors are described below:

- Baldwin and Ford (1988), identified characteristics a trainee, as well as the work environment, needed in order to help improve transfer of learning.
- Baldwin and Ford (1988) also emphasized the importance of supervisory and management support as well as emphasis on use of skills and knowledge acquired on the job, with regard to goal-setting and feedback.
- Baldwin and Magjuka (1991) describe four parts of successful transfer of learning to the workplace: (a) making learners accountable for their own learning, (b) making the learning activity mandatory, (c) requiring managers to emphasize the

value of the program prior to the learning program, and (d) demonstrate that the managers are involved in the learning.

- Brinkerhoff and Montesino (1995) performed a study of a corporation to determine the value of supervisor involvement before and after a learning intervention. When trained personnel were compared to untrained personnel, the personnel with supervisor support performed significantly better, applying what was learned on the job. This support included discussion of the value of the knowledge in good performance as well as affording the trainees opportunities to apply the knowledge that had been attained. As well, these supervisors also held the learners accountable for using what they had learned.
- Xiao (1996) reviewed worker performance before and after training in two private and two public electronic firms. Among the factors found to be important to transfer of learning to the workplace was the role of supervision. Tangible results, such as lower scrap rates, were found in some of the electronics plants where supervisors were closely involved with workers.
- Feldstein and Boothman (1997) identified six critical factors that made a significant difference in performance of learners after training. Learners who examined the training beforehand, developed a plan for using the knowledge attained and then practiced the skills attained on the job became better performers. Supervisors were found to aid high performers to transfer their new skills and knowledge by showing interest in and discussing the learning before and after training as well as showing the learner how their performance could be evaluated.

- Seitz (1997) reported that a significant increase in transfer of learning occurred after managers involved themselves in the learning activity and described how the training could be utilized and measured.
- Holton, Bates, and Ruona (2001), developed a learning transfer system inventory, the factors matching characteristics necessary for successful transfer of learning and the outcomes of the transfer.
- Pucel and Cerrito (2001) performed assessments of trainees as to value of the learning and skills acquired to job performance immediately after and a longer time after completion of a training activity. The studies indicated that performers viewed the use and transfer positively.

Of importance is measuring the transfer of learning to the job. Establishing metrics early in the intervention process helps to gain commitment of stakeholders by incorporating them from the very beginning of the planning stage for an intervention.

Supervisors and Problem Solving

What is a Supervisor?

The first level of management is the first-line supervisor, foreman, or whatever name is given to the person who directly oversees the performance of workers. Often, this level of management is the least equipped to help employees become exemplary employees. With time, the first-level supervisor has become the focal point of change that has added complexity and challenge of all kinds. Increasingly complex technology, changes in societal mores, and changes in governmental involvement have placed increased stress on many first-line supervisor not only to enhance worker performance, but also to improve communication, brand identification, and

job satisfaction. But again the questions: Are supervisors doing that? Do supervisors have the tools necessary to do that?

What is the Role of a Supervisor?

To relate first-line supervisors and problem-solving, both need to be defined. The role of a first-line supervisor may be described through examining the knowledge and skills needed by first-line supervisors, especially new first-line supervisors. The knowledge and skills were well-defined by Drucker and Deming. Drucker (2001) presented the notion that: "So much of what we call management consists of making it difficult for people to work" (p. 76). In describing turnover in the transportation field, Barrett and Greene (2008) observe that "… many men and women are heading for the doors. There are lots of reasons for the phenomenon. Low compensation, untrained first-line supervisors and lack of recognition are among the issues." (p. 28). One objective of this research was to turn that statement around so that management, at least on the part of the first-line supervisor, will help people to work better and safer. One of these areas for needed improvement is helping first-line supervisors prepare for a most important three-part task – identifying, analyzing, and deciding how to intervene on the job to improve performance. Since these are the primary tasks of the first-line supervisor, an effective first-line supervisor should develop those three skills. The degree to which these skills are present in an individual first-line supervisor varies between first-line supervisors, but could be honed by each first-line supervisor.

The role of the first-line supervisor in organizational success was emphasized by Drucker for many years. Drucker (1973) reasoned that: "No organization can function well if its supervisory force does not function. Supervisors are, so to speak, the ligaments, the tendons and sinews, of an organization. They provide the articulation. Without them, no joint can move. It

is the supervisor's job to be in the middle. Hence he [sic] must have responsibility, function, and respect in both his relationships, upward to management and downward to the work group" (pp. 280-281). Such a powerful description of the first-line supervisor and the position of responsibility filled by the first-line supervisor can best be fulfilled by a new first-line supervisor by proper preparation to fill that role. Drucker described skills that may exist in a new first-line supervisor, but also may not exist. And, if these skills are possessed by a new first-line supervisor, does that first-line supervisor know how to use those skills properly or even know that such skills are essential to being an effective first-line supervisor?

The job performance challenge of being a first-line supervisor changes continually. As noted by Drucker (1983): "no job is going to change more in the next decade than that of the first-line supervisor. And few people in the work force are less prepared for the changes and less likely to welcome them" (p. 34). Though stated almost three decades ago, Drucker appears to be correct in such an assertion, repeatedly. But there may be a simple, straightforward means by which first-line supervisors can welcome change and create the culture in the workplace that can adapt to change with positive organizational results. Can a new approach to problem-solving by first-line supervisors add a layer of expertise to the existing job knowledge and experience of first-line supervisors?

Other industrial experts have provided similar observations with regard to first-line supervisors and the job of supervising. Deming, noted as an expert in statistical control of processes and people, included several first-line supervisor-related concepts in delineating his 14 Points. Deming (1983), in describing supervision in the medical field, stated: "First-line supervisors need time to help people on the job" (p. 201). Deming included this statement as the first step in improving supervision, Point 7 of 14 Points. Because the amount of time a first-line

supervisor often has available must be distributed among more than one worker, the first-line supervisor should be able to effectively allocate that time in a manner that permits the largest amount of success. Drucker might call this improvement by concentrating on opportunities, and Deming might call this helping workers to do their job effectively.

Even the position name of *first-line supervisor* under-describes what many managers actually expect from first-line supervisors. The definition of the word *supervise* is to oversee the actions of a person or group of people. In fact, first-line supervisors are generally expected to make sure that all employees under their supervision are performing properly to meet the goals of the stakeholders of the organization. Managers really expect that first-line supervisors will help workers to develop what Wallace (2010) calls performance competence, or "the ability to perform tasks to produce outputs to stakeholder requirements" (p.1). While first-line supervisors may be informed of the stakeholder requirements through training, written communication from the stakeholders, and verbal statements from managers, those same first-line supervisors typically receive little or no assistance in learning how to recognize and improve performance competence of those workers being supervised. Analyzing the competence gaps of workers is not a normal part of first-line supervisor preparation, as will be described.

What is Performance Problem-Solving?

To many members of organizations, analyzing to find a root-cause of a problem and problem-solving are the same thing. These people are accustomed to recognizing that the battery in a notebook computer or in an automobile is being depleted. In a facility, personnel are accustomed to reporting and taking action when a piece of equipment is starting to fail or repair supplies are becoming short in supply. More experienced personnel can foresee warning signs of failure of many pieces of equipment or analyze why equipment failed.

While a dictionary definition of *problem-solving* might be *returning something to an acceptable state* this definition would be inadequate for Drucker and would also not describe problem-solving for first-line supervisors. The knowledge and skills needed by first-line supervisors as performance problem-solvers were defined by a number of thinkers. Defying the views of many that came before him, Drucker defined management and supervision in new ways. As described by Drucker (1993), "Results come from exploiting opportunities, not solving problems" and "For results, resources must go to opportunities, not to problems" (pp. 5 – 7). Bennis (1977), in describing leaders, identified the duty of a leader to: "have the ability to clarify problems…to elevate them into understandable choices for constituents..." (p. 43). While Drucker's views are aimed primarily towards executives and managers, the same viewpoint can be held by first-line supervisors in helping workers close performance gaps. Lane, Malkin, Shanken, and Cavendish (2008) advocated: "Practice involving employees in … problem-solving, instead of just telling them what to do" (p. 95).

Opportunity can be seized by first-line supervisors, not simply to help workers perform adequately, but to aid them in performing in an exemplary fashion. The first-line supervisor can not only be able to recognize a problem, but to also recognize an attendant opportunity that would produce a more effective result. For example, if a first-line supervisor recognizes a performance problem of a worker, such as inconsistent performance of a task, then intervening to standardize the performance of the task using a job aid might be the most effective path to follow. Viewing the opportunity to help other workers standardize performance of the same or similar tasks can then result in a more effective outcome than aiding a single worker to improve performance.

One of the important requirements of a first-line supervisor is facility in finding and recognizing performance problems. According to Deming (1983), "First-line supervisors should find causes of trouble and not just chase anecdotes. They need information that shows when to take action, not just figures that describe the level of production and the level of mistakes in the past" (pp. 201 - 202). A first-line supervise might be able to *see* problems that other members of an organization might not recognize.

As workers change, along with society, the first-line supervisor may be required to understand change and how the task of supervision will also change. In seminal research on the subject of worker motivation, Herzberg (1968) advanced two concepts important to this study – motivators-versus-hygiene and job enrichment. In describing those factors in a job that promote job satisfaction, the "growth or motivator factors that are intrinsic to the job are: achievement, recognition for achievement, the work itself, responsibility, and growth or advancement" (p. 57). In describing those factors that promote job dissatisfaction, the "dissatisfaction-avoidance or hygiene…factors that are extrinsic to the job include: company policy and administration, supervision, interpersonal relationships, working conditions, salary, status, and security" (p. 57). Herzberg later stated that presence of the hygiene factors will create no significant job satisfaction, while absence of hygiene factors can very well lead to job dissatisfaction. The reverse of this, according to Herzberg is that presence of the motivating factors can lead to job satisfaction, while absence will create little or no job dissatisfaction (Herzberg, 1987, p. 57).

Job enrichment is applying motivating factors with de-emphasis upon hygiene factors. According to Herzberg (1968), job enrichment "provides the opportunity for the employee's psychological growth" (p. 59). Increasing the ability of first-line supervisors to solve performance problems can be considered job enrichment for those supervisors.

Many experts in performance improvement adhere to the basic principles of motivators-versus-hygiene espoused by Herzberg. Gilbert (2007), advanced the view that: "For any given accomplishment, a deficiency in performance always has as its immediate cause a deficiency in a behavior repertory…, or in the environment that supports the repertory…, or in both. But its ultimate cause will be found in a deficiency of the management system…" (p. 76). Based upon extensive experience, Chevalier believes that: "…many senior managers spend most of their time trying to 'fix their employees,' when it's the work environment that needs to be fixed (Chevalier, R., personal communication, September 14, 2012). Rummler (2007) forwarded the oft-repeated notion that: "Put a good performer in a bad system, and the system will win every time" (p. 55).

Experts in performance improvement also view job enrichment in a similar manner as Herzberg. Chevalier (2007) defined job enrichment as: "…a way you can build opportunities for individuals to fulfill their higher-level needs by providing chances for achievement, responsibility, recognition, personal growth, and enjoyment of the work itself" (p. 188). Van Tiem, Moseley, and Dessinger (2012) further described job enrichment as a "…job design option that makes a job more rewarding and satisfying" (p. 297).

Research also reveals the problems inherent in trying to establish norms of performance based upon assumptions regarding the people expected to adhere to the norms. Herzberg, Mausner, and Snyderman (2009) described the difficulties in establishing any norms that might apply to every worker. Herzberg et al reviewed many studies and initiated many studies of their own to attempt to answer the question: What do workers want from their jobs? One important finding was that the answer depends to a large degree on how the question is posed. If the implication of the question to the responder was what *satisfied* the worker in the job, the answer

is normally different than what *dissatisfied* the worker in the job. The conclusion was that a huge range of answers could be provided to the question. In many cases Herzberg et al found that hygiene problems must be solved before workers could motivate themselves to perform well in a job. Herzberg et al explained in detail: "Among the factors of hygiene, we have included supervision, interpersonal relationships, physical working conditions, salary, company policies and administrative practices, benefits, and job security. When these factors deteriorate below that which the employee considers acceptable, then job dissatisfaction ensues" (p. 112). The inclusion of supervision in the list of hygiene factors brings into question whether the preparation of a supervisor as a problem solver might be a way to remove *supervision* from the list.

How Are First-line Supervisors Typically Prepared to Be First-line Supervisors?

A review of the literature associated with supervision and forty years of personal experience consulting in industry, reveal a common problem of organizations: the lack of initial assistance, or inadequate assistance, in the preparation of first-line supervisors to become performance problem-solvers, to help workers close the gap between existing performance and desired performance. Barrett and Greene (2008), state an observation by a Kansas transportation official, 'You can lose a great employee and get a bad supervisor by promoting them into a supervisory class…" (p. 55). Drucker (2001) described the job of first-line supervisor as a three-part task – identifying, analyzing, and deciding how to intervene on the job to improve performance. Few organizations have been found to have formal programs to aid new or potential first-line supervisors to become effective first-line supervisors, based upon Drucker's definition. First-line supervisory training for many organizations, based upon review of stated training objectives, consists of learning the rules and regulations, company brand, and disciplinary methods (based upon personal communication from R. Chevalier and experience of

the author). Lane, Malkin, Shanken, and Cavendish (2008) list a common complaint of many new first-line supervisors is lack of training (p. 11). Kirkpatrick and Kirkpatrick (2006) emphasize the importance of evaluating first-line supervisory training before they are trained to ensure the training is what the first-line supervisors need to be effective (p. 54).

In addition to all of the adjustment needed to be able to supervise personnel, many new first-line supervisors or experienced first-line supervisors receive little or no preparation to handle problems that interfere with productivity of the workers being supervised. A number of modern studies have focused on performance improvement and the first-line supervisors. Among these are:

- Andia (2008) described use of the Behavior Engineering Model to help all level of management become performance improvers.
- Cowan, Goldman, and Hook (2010) described use of action planning for performance improvement and mentoring to improve performance at an academy training victims' rights professionals and recommended further research in a combination of action research and case study in other fields.
- Hale (2003) advanced the view that first-line supervisors have four responsibilities of first-line managers: direct, expect, equip, and steer and that they should know what is expected of them and how they should perform each function.
- Hardt (1997) described the challenges faced by many supervisors in coping with the changing environment of business and competencies needed by first-line supervisors to meet the challenges they face. Hardt emphasized that human resources management skills are an important part of these competencies.

Many stakeholders of organizations highly value the monetary gains of improved performance through increased organizational unit efficiency, lower use of energy or similar measures, as well as reduced operating costs for equipment and personnel from inadvertent downtime, lost-time accidents, and equipment failures. These are part of the Level 4 Evaluation in the Performance Improvement/HPT Model, the Level 4 Evaluation components as identified by Chevalier (2006), and a part of Level 5 Evaluation (ROI) as defined by Phillips and Phillips (2007). Further, intangible benefits may include positive changes in culture in teams, departments, and the entire organizational unit as a result of improved performance. Each of these benefits to stakeholders can flow from improvement in the ability of first-line supervisors to solve performance problems.

Too often, the solution to any problem involving personnel and performance is to supply more training to all employees, with little or no attention given to the underlying causes for inadequate performance, when the best and cheapest method of improving performance may not include training at all, but a different combination of interventions to better prepare first-line supervisors. According to Broad (2005) "When there is a deficiency in existing performance, unfortunately, there is a well-known tendency for managers to assume that training is the obvious solution to improve performance" (p. 43). Yet this often is not the case. Rummler and Brache (1995) and other performance experts describe that, about four times out of five, resolution of a performance problem does not lie with the performer, but with the managers and first-line supervisors responsible for the performance. As added by Broad (2005), "There is another good reason to avoid selecting training as the solution without careful analysis of other factors. Instruction interventions are often significantly more expensive than other possible

solutions" (p. 44). The benefit of the training should be measurable and obvious before embarking on extensive training as the solution to any performance problem.

What type(s) of preparation do first-line supervisors currently receive prior to becoming, or immediately after becoming, a first-line supervisor in an organization? Knowing what preparation is currently being offered, in general, to become a first-line supervisor will provide information that may be used to determine the elements needed to add strength to the first-line supervisory preparation framework. Knowing specifically what preparation was given to each first-line supervisor in the organizational unit(s) at which research is conducted offers a baseline from which to conduct research. For purposes of this research, comparison of the self-described skills of the first-line supervisors before and after training in use of the job aid as well as observation of the actions of the first-line supervisors were used to gauge the effectiveness of the preparation. Training is used by many companies as a major means of preparing employees to perform on the job. Based on the 2005 State of the Industry report, ASTD estimates that the size of the United States training industry is as follows:

- $80 billion spent annually on the internal learning function
- $30 billion spent annually on external services
- $109 billion annual total expenditure

These numbers are based on a $950 average expenditure per employee, a 115 million full-time civilian workforce, and a 27% external services expenditure. (R. Chevalier, personal communication, September 24, 2012)

These billions of dollars are spent every year in industry on training personnel, in many cases under the assumption that training is the cheapest and best way to prepare personnel in any business to perform proficiently. But as explained by Broad and Newstrom (1992): "Training is

expensive to design and deliver; it should the *last*, not the *first*, intervention…the organization should consider in order to improve employee performance" (p. 5). For this research, the focus of training was on the elements of the PI/HPT Model and Updated BEM and on using the Problem Assessment Tool, the job aid based on both models, to solve performance problems

For some organizations, first-line supervisory training is simply an off-the-shelf training program that an employee may use formally in a classroom or informally on the part of the employee. However, a more refined definition of training may be used to describe the actions necessary to reach the level of knowledge and skills that are needed by employees. Broad and Newstrom (1992) supply just such a definition: "Training consists of instructional experiences provided primarily by employers for employees, designed to develop new skills and knowledge that are expected to be applied immediately upon (or within a short time after) arrival on or return to the job" (p. 5). This definition leads to the conclusion that the responsibilities of the organization to train first-line supervisor is on-going and constant, rather than isolated to mandated or proscribed off-the-shelf training.

Training programs currently available to train first-line supervisors, including off-the-shelf training available from training companies, as well as the training supplied from the organization owning the facility, whether self-study, on-the-job, or formal training, were examined. Information available from organizations, such as the International Society of Performance Improvement (ISPI) and the American Society for Training and Development (ASTD), were examined, whether from surveys, articles, or research publications were used in helping to answer this research question.

A prominent training program for first-line supervisors, for example, is *Stepping Up* by Lane (2007). In the introduction to this particular first-line supervisor training program, a very

important statement is made: "When you become a first-line supervisor, your role has changed. You are responsible for both the interests of the organization and the interests of the employees" (p. 1). Helping employees to improve performance has the very valuable property of fulfilling both responsibilities. Of importance to this research project is in what ways first-line supervisors are prepared to solve problems using what has been supplied to those first-line supervisors in knowledge and tools.

An essential part of the expectations of stakeholders for first-line supervisors is that the first-line supervisor be viewed as a leader by workers. Traynor (2008) posed the question: "Why do new first-line supervisors often fail?" (p. 20) and then answered the question: "Credibility, accountability and trust are virtues which make any boss highly effective in creating loyalty and record-breaking performance. Employees feel pleased to work for supervisors that are authentic in their hands-on knowledge…" (p. 21). Traynor provided principles for supervision and management and they form a basis for initial and later preparation. Traynor stated that the change from employee to first-line supervisor is not an easy one, yet very few new first-line supervisors get aid. First-line supervisors, according to Traynor, should get training aid for immediate improvement in results.

The elements of preparation of supervisors should prepare the supervisors for success in supervision. In trying to determine what an effective, well-trained first-line supervisor does, Smith (2009) asked how a company can identify "behaviors and characteristics that may support exemplary performance in workplace learning and performance (WLP)" (p. 27). Smith (2009) reviewed a 2004 study of performance undertaken by the American Society of Training and Development (ASTD). This ASTD study of performance gave employers some guidance on how to look for and hire personnel, but Smith stated that, "This competency study, while crucial

to professionalizing the field, left two questions unanswered: What are the differences between exemplary and typical [workplace learning and performance] performers? And, what are the established performance standards used to judge or determine performance?" (p. 27). The ability to solve performance problem can be included in the list of characteristics of exemplary supervisors.

Another essential skill of a first-line supervisor is to be a good listener, especially open to listening to workers. Witt (2007) researched how important awareness and open communication skills are to a first-line supervisor. Witt concluded that: "A properly trained first-line supervisor can assist employee retention by creating a work atmosphere that fosters growth through better communications and understanding" (p. 47). Witt emphasizes the importance of the awareness of the teacher also should be taught to the first-line supervisor. Witt described the importance of each first-line supervisor learning to listen, knowing learners – what they know and what the need to know – and described the increasing awareness and value of communication to the success of a first-line supervisor. Coaching for this research included an emphasis on being a good listener in order to elicit the information needed to solve performance problems.

Many first-line supervisors begin their careers concentrating on efficiency, at least partly because they have been told that developing and maintaining high efficiency are essential focuses of a first-line supervisor. But this is a fallacy according to Drucker (1973): "Efficiency is concerned with doing things right. Effectiveness is doing the right thing" (p. 45). As Drucker goes on to explain, effectiveness must be achieved before efficiency, since efficiency can be viewed as maintaining the proper level of effectiveness. Are workers doing what they have been directed to do efficiently, or are workers doing the tasks that make each worker the most

effective in producing the desired organizational results? What have first-line supervisors been taught as first-line supervisory responsibilities?

Many methods may be used by management to prepare first-line supervisors to be performance problem-solvers. P. F. Roethlisberger advocated the inclusion of human relations training in classroom courses in America soon after World War II. Even as the use of training had increased in many companies, Roethlisberger (1951) averred:

> For some time now I have been impressed by how ineffective and unrealistic many of these programs are. They do not accomplish what they are designed to do, that is, to help supervisors with the human aspects of their jobs (p. 47).

Roethlisberger believed that the curriculum for supervisory training had to be flexible, based upon the existing skills of the supervisor/trainee, and make use of case study far more than traditional lecture in the classroom.

One suggested method of training first-line supervisors is to handle all aspects of supervision with on-the-job training (OJT). As reported by Kirkpatrick (1997), surveys of training in industry for supervisory personnel, whether in operations, production or clerical personnel, indicated about three-quarters was conducted on-the-job (p. 218). Kirkpatrick also stated that "having the boss…heavily involved" is also a very effective method of increasing transfer of learning. Kirkpatrick also emphasizes that the training should take place after careful selection of a first-line supervisor for the position, but before that first-line supervisor accepts the position.

A study performed on 28 foundries in the Midwestern part of the United States by Imberman, an industrial management consultant, in 2006 found that training of first-line supervisors can be successful as well as not so successful. The management of each of the

foundries had provided first-line supervisory training to first-line supervisors, with mixed results. Seven were found to have increased productivity in the years following the training and the remaining twenty-one had experienced very little or no increase in productivity. The analysis of data produced results that bear directly on current needs for content and methodology of first-line supervisory training. As described by Imberman (2006),

> Several key conclusions became evident:
>
> - First, at 18 of these foundries, training focused on how to deal with hourly workers, but the organization of their work was ignored. Instruction and explanation of planning, problem-solving, simple use of … root-cause identification, delegation, and analysis of production data (quality, productivity, on-time shipments) were lacking.
> - Second, the training was *canned* (i. e., off-the-shelf, ready-made) in 15 of the 21, the training was an off-the-shelf course from some local institution or area association. Training of this kind is often inexpensive, but ineffective. Because such courses are necessarily general, first-line supervisors saw little connection between what was taught and their own situations. Effective training requires case materials from the first-line supervisors' own facility. The instructor must dig for local case materials with relevant examples.
> - Third, not all the proper personnel were included. In 16 of the 21 foundries with sub-standard performance, the training omitted support and technical staff - plant engineers, production schedulers, quality gurus, and others whose own jobs involved helping organize the work of front-line first-line supervisors and employees.

- Finally, in 17 of the 21 foundries, internal communications were poor. Few efforts were made to monitor or remedy the problems of front-line supervisors, hence the irrelevant training (p. 36)

This study pointed out the obvious potential problems when training is not planned and delivered in a manner that suits the needs of the organization, especially for the first-line supervisors within the organization.

Many organizations provide little, if any, training for first-line supervisors to help them prepare to be first-line supervisors or to help them become problem-solvers. In "Training TOP 125 2009," in the magazine *Training*, the overview for each of the 125 companies lists the types of training presented at that company and the reasons for listing each company. Of the 125 companies from throughout the world, only ten capsules included any mention of supervision, with half of the ten capsules using the term in relation to first-line supervisory support of technical education. The five capsules that specifically mentioned first-line supervisory training indicated that the supervision was on leadership style and understanding the legal aspects of supervision. None of the five capsules referred to problem-solving or the value of such knowledge to first-line supervisors.

According to the ASTD (2012) Report on Training 2011, ASTD estimates that U.S. organizations spent $1228 per learner on employee learning and development in 2010. Baum and Scott (2010) state that this expenditure does not account for time lost in training. "Employers have embraced the need for employee training with such an expenditure" (p. 1). Yet only a tiny fraction of that amount appears to be devoted to first-line supervisor training as learning to be problem-solvers. What if first-line supervisors could be prepared in a manner that reaches far beyond any typical training to provide the knowledge and skills needed by first-line

supervisors to help employees resolve performance problems? In addition, a search of on-line preparation and preparation program development advertising resulted in very few companies providing preparation in problem-solving, with the exception of root-cause analysis of physical systems made up of equipment. As an exception, Chevalier does include problem-solving as part of the training for first-line supervisors, as described at the website www.aboutiwp.com.

How Effective Are First-Line Supervisors as Performance Problem-Solvers?

The effective first-line supervisor helps workers reduce error and seize opportunity. Drucker (1966) said about executives, "In every area of effectiveness within an organization, *one feeds the opportunities and starves the problems*. Nowhere is this more important than in respect for people" (p. 98). Rather than view themselves as a problem-solver, the first-line supervisor could recognize that both they and the workers under their supervision share opportunities for exemplary performance. By removing the problem and concentrating on maximizing opportunity, not only will any perceived performance gaps be closed, but unrecognized performance gaps will also be closed. Drucker (1966) was one of the first to recognize and state that leaders do not change human beings, rather leaders "multiply strength, whatever health, whatever aspiration there is in individuals" (p. 99). Effectiveness of the first-line supervisor can be seen to flow from the ability to recognize opportunities and then the capacity to effect change that will improve results.

Recognizing problems as opportunities to improve is an important part of the first-line supervisory thought process. Deming included in his 14 Points a point regarding improving supervision. According to Deming (1983), "First-line supervisors should find causes of trouble and not just chase anecdotes. They need information that shows when to take action, not just figures that describe the level of production and the level of mistakes in the past" (pp. 201 - 202).

Deming's view of taking action to find and correct *causes of trouble* coincides with Drucker's view of looking for opportunities rather than looking to correct problems. The needs of first-line supervisors to know how to recognize, analyze, and implement response to opportunity are paramount, yet not emphasized sufficiently in the preparation of most new first-line supervisors for their position. Yet many of the available training programs appear to pay short shrift to the needs of first-line supervisors relative to opportunities.

How Does the First-Line Supervisor Deal With Workers' Performance Problems?

An increasingly important skill of first-line supervisors is being able to communicate, as well as recognize problems and opportunities, across gaps such as age difference. Several research studies examined age differences among employees of organizations, defining, in general, three groups of workers based upon age: Baby Boomers (born before 1964), Generation X (born between 1964 and 1980), and Generation Y (born after 1980). Members of Generation Y are frequently also identified as "Millenials". With regard to the attitudes and expectations on the job of these general groups of people, some researchers emphasize the importance of difference between the age groups, while others minimize the differences. Some of the findings of these researchers include:

- In the October 2009 issue of *Trends E-Magazine*, an editorial article titled "Boomers and Millenials Define the New Workplace," the confrontations to first-line supervisors are examined. Just as Baby Boomers (*born between 1946 and 1964*), with conservative and conventional views who stay at jobs for a long time, are being replaced by Millenials (*born after 1964*), who change jobs often and challenge everything they are told, as described in the article, the problems that will be borne by all first-line supervisors become very obvious. The article suggested that modularizing functions and jobs and

utilizing flexibility in approach are necessary to creating the sense of community and success needed by Millenials (*born after 1964*) will be a challenge to most first-line supervisors. The article described two other elements will be challenging to first-line supervisors. These are described as progressive and intergenerational mentoring, not common elements of many available training programs or *old skills* of first-line supervisors. The closing sentence in the article described the first-line supervisory problem in the future in a nutshell: "Those companies that come up with the most appealing solutions that allow Millennials (*born after 1964*) to both live richly and work richly will find themselves in the best position to profit in the coming decade" (p. 22). Are supervisors prepared for this challenge in the future, especially in the area of problem-solving?

- Howe and Strauss (2000) defined Generation X as those born after 1964 and before 1982 and Millenials as those born after 1981 and emphasized the importance of age difference: "Millennial attitudes and behaviors represent a sharp break from Generation X, and are running exactly counter to trends launched by the Baby Boomers." (p. 1)
- Raines (2002) defined Millennials as those born after 1981 and described their work ethic, what they expect from a job, and where employers "go wrong" when dealing with Millennials:
    - Work ethic:
        - "Confident. Raised by parents believing in the importance of self-esteem, they characteristically consider themselves ready to overcome challenges and leap tall buildings. Managers who believe in "paying your dues" and coworkers who don't think opinions are worth listening to unless they

come from someone with a prerequisite number of years on the resume find this can-do attitude unsettling.

- Hopeful. They're described as optimistic yet practical. They believe in the future and their role in it. They've read about businesses with basketball courts, stockrooms stocked with beer for employers, and companies that pay your way through school. They expect a workplace that is challenging, collaborative, creative, fun, and financially rewarding.
- Goal- and achievement-oriented. Just a day after she won a totally unexpected Olympic gold medal, skater Sara Hughes was talking about her next goal—scoring a perfect 1600 on her SATs. Many Millennials arrive at their first day of work with personal goals on paper.
- Civic-minded. They were taught to think in terms of the greater good. They have a high rate of volunteerism. They expect companies to contribute to their communities—and to operate in ways that create a sustainable environment.
- Inclusive. Millennials are used to being organized in teams—and to making certain no one is left behind. They expect to earn a living in a workplace that is fair to all, where diversity is the norm—and they'll use their collective power if they feel someone is treated unfairly."

- What Millenials want from a job:
  - to work with positive people
  - to be challenged
  - to be treated respectfully

        - to learn new knowledge and skills
        - to work in friendly environments
        - to have flexible schedules
        - to be paid well
    - Where employers "go wrong":
        - not meeting their high expectations
        - discounting their ideas for lack of experience
        - allowing negativity
        - feeling threatened by their technical knowhow
- Pew Research Center (2010) defined Baby Boomers as those people born before 1965, Generation X members as those born between 1965 and 1984, and Generation Y (Millennials) born after 1984. The Pew Survey characterized Baby Boomers as proponents of decision-making, cost effectiveness, and building relationships over time, but low in knowledge of technical devices (computers and cellphones) and social media. Generation X, according to Pew Research, believe decision-making, problem-solving, and entrepreneurship to be important, but have limited knowledge of technical devices and social media. On the other hand, Millennials have extensive knowledge of technical devices and social media, but have little ability in decision-making or cost effectiveness.
- Lies (2007) emphasized that, as Baby Boomers continue to retire, extensive knowledge of legal aspects of dealing with workers will continue to leave with them, with the remaining supervisors having limited experience in dealing with legal issues in the workplace and management failing to fill the gap through training or other methods to prepare Generation X supervisors to handle the void left in the workplace.

- Deal, Altman, and Rogelberg (2010) minimized the difference in age as an important factor affecting communication between supervisor and worker and that individual relationships between supervisors and workers are rarely defined by age. "When thinking about generational differences, it is important to remember that individual behavior is a result of an interaction between an individual's predispositions and what behavior the environment encourages and discourages" (p. 194).

Upon review of the data from the numerous studies reviewed by Herzberg et al, the role of the first-line supervisor became the focal point in improving the motivation of workers to perform their work with the requisite motivation to be exemplary performers. Herzberg et al stated: "…it is likely that a successful first-line supervisor was often instrumental in structuring the work so that his subordinates *could* realize their ability for creative achievement" (p. 133). Further, Herzberg et al came to the conclusion: "In summary, what is the task of the first-line supervisor? He will have to learn discriminatively to recognize good work, to reward this good work appropriately" (p. 134). Further studies of worker satisfaction support the views of Herzberg. Schaefer, J. (2009) stated, "When surveyed, employees consistently will ask for cash, but research shows that it is the least effective form of recognition" (p. 1). Then what can the supervisor do to provide recognition for exemplary performance?

The trend report of a Family and Work Institute study named the 2008 National Study of the Changing Workforce stated that "…the definition of an effective workplace…includes six factors: job challenges and learning, autonomy, work-life fit, supportive supervision, a climate of respect and trust, and economic security" (p. 11). The trend report called upon businesses to attempt to create this effective workplace. Deming's 14 points included Point 5: "Improve constantly and forever every process for planning, production, and service, to improve quality

and productivity, and thus constantly decrease costs" (Deming 1983, p. 23). This worthy goal of Deming is a valuable goal for supervision. Can first-line supervisors perform traditional assigned responsibilities, such as overseeing workers and helping ensure that work is performed properly, as well as take on the newer and developing responsibilities of working with an ever-changing workforce as their assistant and their performance problem-solver? One place to start to answer this question of the role of the first-line supervisor is to more thoroughly understand the Performance Improvement/Human Performance Technology Model and the Updated Behavior Engineering Model and how both could be of use to first-line supervisors.

Performance Improvement and the Human Performance Technology Model

What is Performance Improvement?

Performance improvement is the art and science of improving performance of individuals in the workforce. Van Tiem, Moseley, and Dessinger (2012) defined performance improvement: "Performance improvement includes theories of systems, quality, communications, learning, human resources, organizational design and development, and more" (p.xxxv). Chevalier (2007) added a major benefit of performance improvement to an organization: "Performance improvement provides an overall game plan for interacting with employees" (p. 2). Of importance in each of these definitions by these experts, as well as many other experts that have contributed to the field of performance improvement, is the emphasis on the word "human". Improvement of performance of individuals, at each level in an organization, can be viewed to flow from the analysis of performance and activity to reduce barriers to good performance. As further stated by Van Tiem, Moseley, and Dessinger (2012): "[P]erformance improvement is a systematic process that links organizational and business goals and strategies with the workforce

responsible for achieving the goals" (p. 5). Thus performance improvement is not just a goal, but also a means to achieve the goal.

What is Human Performance Technology (HPT)?

The Human Performance Technology (HPT) Model is a framework for pursuing performance improvement. As described by Van Tiem, Moseley, and Dessinger (2012): "…[P]erformance technology... implies a focus on using a set of methods and procedures to improve the work, worker, workplace, and/or world" (p. 5). This framework includes both performance analysis and cause analysis, as well as interventions to improve performance, and evaluation in each phase of the process in order to drive change.

The Performance Improvement/Human Performance Technology Model

The Performance Improvement/Human Performance Technology Model is a systematic approach to gaining improvement in performance of individuals as well as the organizations of which the individuals are a part. The major elements of the Performance Improvement/Human Performance Technology Model are (a) performance analysis of need or opportunity for improvement, (b) selecting one or more interventions based upon the performance analysis, (c) implementation of the intervention(s), and (d) evaluation of all phases of the activity of the Model. (Van Tiem, Moseley, & Dessinger, 2012). The International Society of Performance Improvement (ISPI) website (www.ispi.org) describes the Performance Improvement/Human Performance Technology Model: "It is a systematic combination of three fundamental processes: performance analysis, cause analysis, and intervention selection, and can be applied to individuals, small groups, and large organizations." The Performance Improvement/Human Performance Technology Model delineates these fundamental. The full Performance

Improvement/Human Performance Technology Model is illustrated in Figure 2.

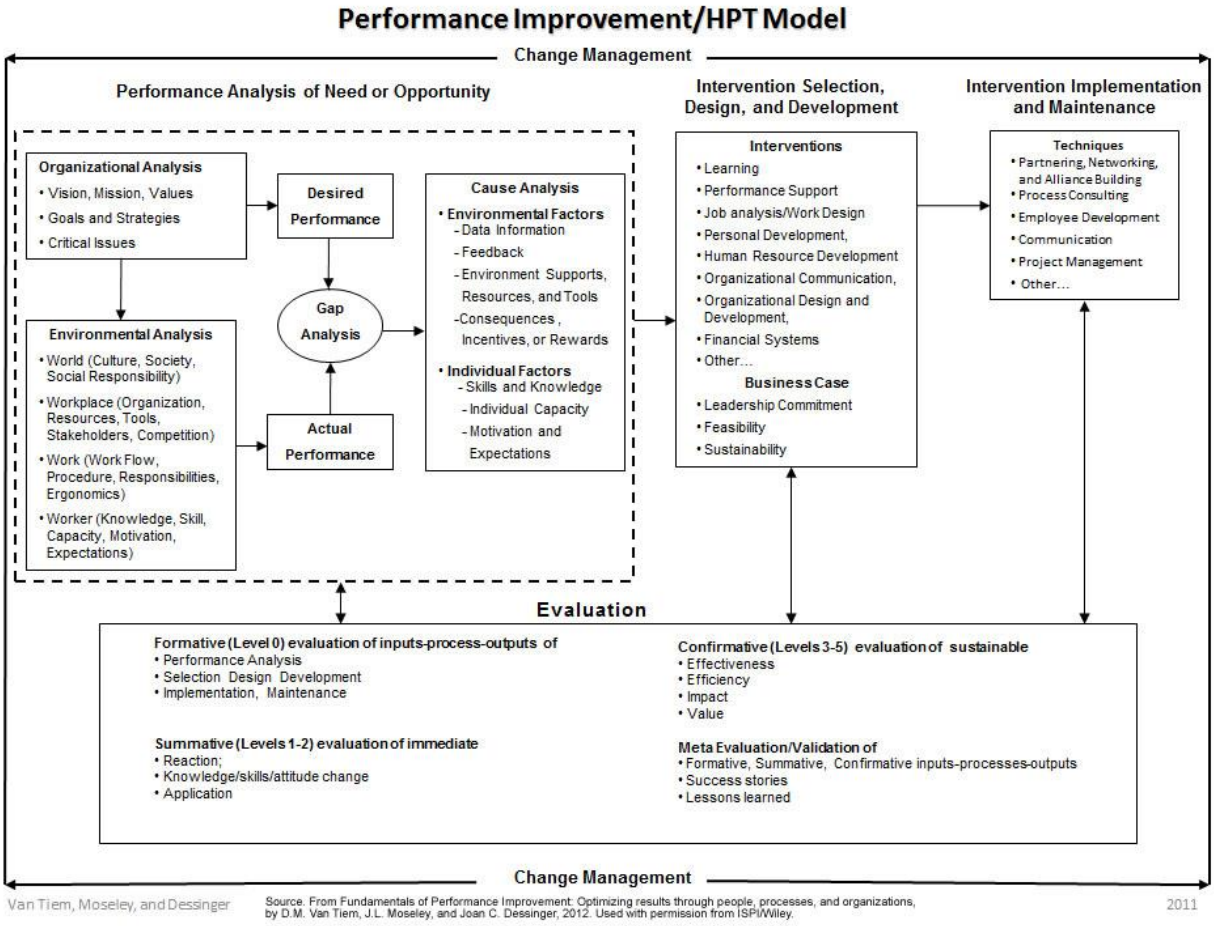

Figure 2. Performance Improvement/Human Performance Technology Model. From Figure 2.1 of *Fundamentals of performance improvement,* (3rd edition) by Van Tiem, D, Moseley, J., & Dessinger, J. 2012, San Francisco, CA: Pfeiffer, Copyright 2012 by ISPI. Reprinted with permission.

Performance Analysis

Performance Analysis is the beginning point of the Performance Improvement/Human Performance Technology Model, but also serves as a returning point for use as part of a continual organizational development model. Performance analysis begins by analyzing the organization itself, including the organizational values and aspirations. The current and future goals of the organization are examined in the light of current issues in order to develop a desired level of performance of the organization, organizational unit, or member of the organization.

Important to the analysis of performance of a workgroup, whether that workgroup is the organization itself, a unit of the organization, or an individual, is analysis of the environment. Van Tiem, Moseley, and Dessinger (2012) included the following factors in environmental analysis:

> "*World* – external considerations such as society, culture, and social responsibility
>
> *Workplace* – internal considerations such as available resources, tools, and human resources policy tools
>
> *Work* – job design considerations such as workflow, ergonomic issues, stakeholders, and competition
>
> *Worker* – personal considerations such as skill level, knowledge, motivation, capacity, and expectation" (p. 46)

The Performance Improvement/Human Performance Technology Model makes use of the environmental analysis to define the actual performance desired of the work worker or group being analyzed.

With the organizational analysis used to establish desired performance and the environmental analysis used to establish actual performance, the performance gap can be estimated as the difference between the two analyses. This gap can be stated in terms of both a quantitative component, such as a number describing the reduction of the percentage of errors, and a qualitative component, such as a description of increased skills or proficiency. (Van Tiem, Moseley, & Dessinger, 2012). This performance gap should be thoroughly understood before any performance improvement can be implemented.

The final part of performance analysis is cause analysis of the performance gap. According to Van Tiem, Moseley, and Dessinger (2012): "The final performance analysis phase

takes a deeper look to determine what actually caused the performance challenge or what can be optimized to meet the performance opportunity" (p. 46). One of the best and most powerful tools to achieving cause analysis is the Updated Behavior Engineering Model, described in the next section.

Selection and Implementation of Interventions

The next part of the Performance Improvement/Human Performance Technology Model is selecting and designing the types of interventions that will be most effective in reducing the performance gap resulting from the performance analysis. Several viewpoints by performance improvement experts in the selection and implementation of interventions include:

- The selection of intervention or combination of interventions should be based upon "outcomes or results, impact, value, costs, and benefit to the organization and the situation" (Van Tiem, Moseley, & Dessinger, 2012, p. 47).
- The selection of intervention(s) should also be based on "a reasonable goal that can be met in a short time, such as three months to a year…The reasonable goal should be described using the same quantity, quality, time, and cost as used for the baseline analysis. The reason for setting a reasonable goal is to give the employee a target that can be met in short order and relatively easily, and which, when met, will provide the motivation to continue meeting higher goals" (Chevalier, 2007, p. 90). Practice and experience of the performance improvement practitioner aid in selecting reasonable goals.
- "Specify a solution set that addresses all significant factors that affect the gap in results…organize recommended changes to meet various…needs and priorities. (Rummler, 2007, p. 7)

- Before implementing any intervention, an evaluation strategy for the intervention should be developed (Barksdale & Lund, 2001, p. 25)
- "Measuring application and implementation is critical to understanding the success of project implementation. Without successful implementation, positive business impact will not occur – and no positive return will be achieved" (Phillips & Phillips, 2007, p. 83)

Applying each of these ideas permits the best chance of success of any intervention.

A number of interventions of various types might be selected, depending upon the cause, or causes, identified in the cause analysis. Chevalier (2007) lists the following as potential solutions to choose from:

Information-Based Causes:

- Provide clear expectations
- Develop guidelines/checklists
- Give timely, specific feedback
- Refine work standards
- Coach regularly

Resources-Based Causes:

- Provide necessary tools, equipment, time, and materials
- Refine processes and procedures
- Provide a safe workplace

Incentive-Based Causes:

- Identify performance measures
- Reinforce positive performance

- Hold employees accountable
- Enrich jobs
- Develop career tracks

Knowledge/Skills-Based Causes:

- Select in/select out
- Train and develop
- Cross-train team

Capacity-Based Causes:

- Select in/select out
- Encourage personal and professional development

Motives-Based Causes:

- Select in/select out
- Align individual goals
- Shape expectations (p. 132)

As Chevalier (2007) advised: "Solutions need to be selected on the basis of the causes of the problem, the costs involved, and the organization's culture. Primarily, you must make sure that the costs of the solutions you select are not greater than the benefits that will be delivered" (p. 131). In many cases in organizations, training is viewed as the universal solution, when a simpler solution may be much less costly and much more effective.

One important consideration in selecting a solution, which also applies to implementation of interventions, is the stakeholders for the organization, especially the primary stakeholders, those directly affected by the performance gap. As Van Tiem, Moseley, and Dessinger (2012) counseled for businesses: "Performance improvement and performance technology efforts can

get caught up with the enthusiasm of the team members and others committed to change without taking a good hard look at leadership commitment, feasibility, and sustainability" (p. 49). Gaining stakeholder support as well as maintaining communications with stakeholders in each phase of application of the Performance Improvement/Human Performance Technology Model are important to success of interventions.

Following intervention selection and design in the Performance Improvement/Human Performance Technology Model is intervention implementation and maintenance. Van Tiem, Moseley, and Dessinger (2012) defined this step as "the actual doing, the putting into motion of the selected intervention or interventions" (p. 50). Implementation may require the use of extra resources, such as outside consultants or experts, as well as close attention to communications and involvement of other members of the organization, especially stakeholders. As Van Tiem et al (2012) stated: "There is need to communicate expectations throughout the organization. Performance improvement implementation requires communication of plans and progress" (p. 50). Intervention maintenance requires sustained effort to complete the process of implementation and measurement of progress attained.

Evaluation

The final part of the Performance Improvement/Human Performance Technology Model is evaluation. Evaluation impacts each of the other parts and is impacted by each of the other parts. The outputs of each part are inputs to evaluation and evaluation results are, in turn, inputs to each part. "Measuring and reporting results are critical for maintaining the confidence of the organization and stakeholders…" (Van Tiem, Moseley, & Dessinger, 2012, p. 50). On the formative level (called Level 0), constant review and evaluation of performance analysis as well as interventions selected and implemented is performed to attempt to make sure that each cause

has been included in both the analysis and the potential solutions used to close the performance gap.

One of the methods used for evaluation is composed of the evaluation levels Kirkpatrick (1997) used for training. Kirkpatrick (1997) advanced the notion that: "The most common reason for evaluation is to determine the effectiveness of a program and ways in which it can be improved" (p. 16). While Kirkpatrick was referring to evaluating training programs, these levels also apply to the Performance Improvement/Human Performance Technology Model. The four Kirkpatrick levels are:

Level 1 – Reaction

Level 2 – Learning

Level 3 – Behavior

Level 4 – Results

One very useful addition to the Kirkpatrick levels is Phillips' Level 5, or return on investment (ROI), an extension of the results (Level 4). Level 5 evaluation contains both a monetary component and an intangible component, both of which should be part of evaluation (Phillips & Phillips, 2007, p. 28).

The evaluation levels that apply to the Performance Improvement/Human Performance Technology Model, as described by Van Tiem, Moseley, and Dessinger (2012) are:

Formative (Level 0) of inputs, process and outputs

Summative (Levels 1 and 2) initial evaluation of:

- Reaction
- Knowledge, skills, and attitude changes
- Application

Confirmative (Levels 3 through 5) continuing evaluation of:

- Effectiveness
- Efficiency
- Impact
- Value

Meta Evaluation/Verification of:

- Formative, summative, and confirmative inputs, process, and outputs
- Success stories
- Lessons learned (p. 43)

Evaluation is the key to not only looking back at the application of the intervention, but also looking forward to use of the intervention in the future.

Appreciative View of the Model

One concept may be added to the Model is appreciative view, or looking for the *good* things that happen as a result of applying the Model rather than concentrating on the *bad* things. Rosenzweig and Van Tiem (2007) advanced the view that: "…there are times when the problem-centered approach is not sufficient. Instead, attention to organizational strengths and a focus on creating and building a positive vision for the future represent a better strategy" (p. 36). The appreciative approach, as described by Rosenzweig and Van Tiem (2007) shifts focus on the performance analysis to a positive view by means of "…two primary changes: the addition of a positive experience analysis as well as a reframing and conversion of the cause analysis into a strengths analysis. The positive experience analysis is an important addition that expands data collection to include insights at the individual level, especially those of a positive nature" (p. 38).

The appreciative approach has the potential to improve acceptance and further the likelihood that future implementations might be well-received by participants and stakeholders.

Behavior Engineering Model

Needs Assessment

Gilbert's Behavior Engineering Model, as updated by Chevalier, may very well contain the majority of the elements needed by a first-line supervisor to aid workers to improve performance. The Updated Behavior Engineering Model can provide a framework to recognizing and analyzing the potential causes of performance problems. Van Tiem, Moseley, and Dessinger (2012) advanced the notion that the "Behavior Engineering Model focuses on changing work environment aspects such as information resources, incentives, knowledge, capacity, and motives to improve performance" (p. 11). Van Tiem et al (2012) also described the work of F. Taylor: "Taylor's *scientific management* principles include: authority based on knowledge instead of position; the first wage incentive system; breaking down tasks into smaller components; creation of a productivity expert... laid the foundation for the modern assembly line" (p. 12). Gilbert followed the time-motion studies of Taylor, pursuant to the industrial revolution, with a heretical thought – maybe the problem with human performance in a job is the *job* and not the *human*. This was a complete reversal of the thought process in industry in the early 1950s. Gilbert viewed this conclusion as a natural follow-on to critical examination of work and the work environment, as described well in Gilbert's writings.

Many other researchers have added important parts of human competence theory grounded in the ideas of Gilbert. Among those principles developed is the concept of analysis of a problem. Analysis is the key to understanding performance problems and performance gaps. Van Tiem, Moseley, and Dessinger (2012) stated that "a gap between the available

environmental supports,….and the performance support requirements or needs of the worker usually drive or cause a performance gap" (p. 166). Gilbert (1978) postulated that: "Absence of performance support (not skills and knowledge) is the greatest block to exemplary work performance" (p. 32). It is notable that Gilbert expresses that the real value in training may actually be realized by the performance support associated with the training rather than the training itself.

Many leaders, whether in academia, industry, or government, are unable to analyze the causes of performance problems in the particular domain within which the leader exists. As stated by Gupta (2007):

> Throwing resources at problems or opportunities is like throwing a chocolate pie at a wall and hoping some of it will stick: the action is more likely to create a mess than an improvement; furthermore it is a waste of good resources (p. 16).

One of the most suitable alternative to *pie throwing*, whether termed gap analysis, cause analysis, or needs assessment, is to investigate the actual problems and the causes of those problems in order to determine the best solutions to the problems. Rossett and Volki (2000) stated: "Abraham Lincoln understood the importance of analysis even though he didn't know a task analysis from a goal analysis. He said, 'If I had eight hours to chop down a tree, I'd spend six sharpening my ax'" (p. 30). Front end analysis is crucial to and should guide the solution to any problem, especially a performance problem.

Needs assessment may be defined as the identification of where an organization is compared to where it should be, whether as a whole or in part. A Needs Assessment is a systematic process of assembling information from human beings that are in any way associated with the problem (or problems) being examined, as well as any documentation that could be

relevant, and then attempting to determine the ways in which barriers might be removed or reduced to close the gap between goals and accomplishments. Assessment should be *blind* to preferred methodology used to improve human performance, instead enumerating the methodology or combination of methodologies that would be most efficient and effective in accomplishing the goal. While not excluded from the identified interventions, training should be viewed as a part of the approach and not THE approach. Again, as advanced by Rossett (2009), "It would be unusual to use all of these sources in any one performance analysis. The trick is to pick well and to recover from poor selections rapidly" (p. 24). Once again, practice and experience can minimize the instances in which recovery from poor choice is necessary.

Gilbert and His Theories

Leaders may benefit from taking the time to find out what the problem is before any *cure* can be envisioned. Some ways to analyze performance problems include the methods proposed by Gilbert and Harless, a disciple of Gilbert. As reasoned by Rossett (2009): "Without analysis, there is no Human Performance Technology" (p. 139). "The works of Gilbert, Harless, Mager, and Rummler became the principles of the foundations of performance analysts and HPT modeling theory... Many have acknowledged Gilbert to be the 'Father of Performance Technology" (Wilmoth, Prigmore, & Bray, 2002, p. 17). Gilbert's Behavior Engineering Model forms the basis of this research in that the Behavior Engineering Model is the centerpiece of the job aid that will be utilized by first-line supervisors to improve performance. The original Behavior Engineering Model is illustrated in Table 2.

Table 2.

Gilbert's Behavior Engineering Model

Environmental Supports	Information	Relevant and frequent feedback about the adequacy of performance Descriptions of what is expected of performance Clear and relevant guides to adequate performance
	Instrumentation	Tools and materials of work designed scientifically to match human factors
	Incentives	Adequate financial incentives made contingent upon performance Nonmonetary incentives made available Career-development opportunities
Personal Behavior	Knowledge	Systematically designed training that matches the requirements of exemplary performance Placement
	Capacity	Flexible Scheduling of performance to match peak capacity Prosthesis Physical shaping Adaptation Selection
	Motives	Assessment of people's motive to work Recruitment of people to match the realities of the situation

From *Human competence: Engineering worth performance*, (tribute edition) by T. F. Gilbert, 2007, San Francisco, CA: Pfeiffer. Copyright 2007 by Pfeiffer. Reprinted with Permission.

In accordance with the Behavioral Engineering Model, there is a relationship between behavior, accomplishments, and performance. "Behaviors are what people do, accomplishments are their outputs, and individual performance includes both behavior and accomplishments." (Gupta, 2007, p. 33) Performance is how an individual worker acts on the job compared to how an exemplary worker would act on the job, including how well the worker overcomes the problems the worker encounters. Gilbert also considered these problems to be unavoidable for the worker, being environmental problems. Gilbert defined a performance problem as any block to exemplary performance by an employee and felt that support factors were important to worker performance. Gilbert believed: "When identifying the solutions that will yield performance

improvement, it is essential to begin by identifying any missing support factors" (Dean, 1997, p. 48). Gilbert believed that these support factors were both environmental and individual. The Behavior Engineering Model of Gilbert "represents the seed or essence of an understanding that exploded the field of programmed instruction (PI) into the much broader and more powerful field of human performance technology (HPT). It has been used in one form or another by thousands (maybe tens of thousands) of performance improvement professionals and management consultants to analyze, problem-solve, design, and implement solutions for an enormous range of human performance challenges, from individual performance situations to entire organizations" (Binder, 2005, p. 1). When combined with the Performance Improvement/Human Performance Technology Model, a job aid, such as the one refined in this study, can become an important key to performance improvement.

In accordance with the Behavioral Engineering Model, the major factors that influence behavior that do not result in acceptable performance are usually related to environment. The work environment should be closely examined to determine which factors in the environment need to be changed in order to change the performance of the person working in that environment. Gilbert was an associate of both B. F. Skinner and Frederick Taylor and several other noted innovators in the world of Human Performance Engineering. "Gilbert took us far beyond training toward a rigorous, observation-based approach to improving performance" (Dean, 1997, p. 46).

In using the scientific approach, Gilbert "believed that three things are required of scientific theory:

- Parsimony – don't use a grand complexity to explain something when a simple account will do as well.

- Elegance – the pieces and parts of a good theory should not be an eclectic mess; they should fit neatly together.
- Usefulness – a good theory should have utility, if not out in the real world, at least in helping science advance" (Dean, 1997, p. 46).

By applying these beliefs to the Behavior Engineering Model, the data collection process was followed scientifically, using specific sets of questions and observation subjects. Unlike many before him, Gilbert believed that major problem that prevented workers from exceptional performance was the work environment itself and that, if the environment could be made more conducive to good behavior, a worker could then produce in accordance with expectations.

Gilbert believed that performance is the transaction between behavior and accomplishments taken together. This means how the worker acts on the job would be the behavior part and the results would be the accomplishment part. He also considered these problems to be unavoidable for the worker, being environmental problems. Gilbert felt that a performance problem is any block to exemplary performance by an employee. He felt that support factors were important to worker performance. Gilbert said: "When identifying the solutions that will yield performance improvement, it is essential to begin by identifying any missing support factors." (Dean, 1997, p. 48)

The Updated Behavior Engineering Model

Gilbert believed that these support factors were both environmental and individual. But of the two, "Gilbert claimed that the absence of performance support factors in the work environment is the single greatest block to exemplary performance" (Dean, 1997, p. 48). Chevalier's Updated Behavior Engineering Model categorized factors that influence performance into six blocks:

- Environmental - Information - to what degree is information to do the job provided
- Environmental - Resources - to what degree are the resources available to do the job
- Environmental - Incentives - to what degree do incentives encourage performance on the job
- Individual - Knowledge - to what degree does the individual have the necessary knowledge and skills to do the job
- Individual - Capacity - to what degree can the individual learn and do the job
- Individual - Motives - to what degree is the individual motivated to do the job

As explained by Chevalier (2003), "The BEM distinguishes between a person's repertory of behavior (what the individual brings to the performance equation) and the environmental supports (the work environment factors that encourage or impede performance)" (p. 8). The Updated Behavior Engineering Model is illustrated in Figure 5.

The original model created by Gilbert has been modified since the inception of the Behavior Engineering Model. While several changes have been made by various authors, such as Binder's Six Boxes (2005), the version of the Behavior Engineering Model developed by Roger Chevalier, and utilized in this research, is described below. To distinguish between the theoretical model of Gilbert and the modifications made by Chevalier, the latter version will hereinafter be called the Updated Behavior Engineering Model.

Table 3.

Updated Behavior Engineering Model

Environment	Information	Roles and performance expectations are clearly defined; employees are given relevant and frequent feedback about

		the adequacy of performance. Clear and relevant guides are used to describe the work process. The performance management system guides employee performance and development.
	Resources	Materials, tools, and time needed to do the job are present. Processes and procedures are clearly defined and enhance individual performance if followed. Overall physical and psychological work environment contributes to improved performance; work conditions are safe, clean, organized, and conducive to performance.
	Incentives	Financial and non-financial incentives are present; measurement and reward systems reinforce positive performance. Jobs are enriched to allow for fulfillment of employee needs. Overall work environment is positive, where employees believe they have an opportunity to succeed; career development opportunities are present.
Individual	Knowledge /Skills	Employees have the necessary knowledge, experience, and skills to do the desired behaviors. Employees with the necessary knowledge, experience, and skills are properly placed to use and share what they know. Employees are cross-trained to understand each other's roles.
	Capacity	Employees have the capacity to learn and do what is needed to perform successfully. Employees are recruited and selected to match the realities of the work situation. Employees are free of emotional limitations that would interfere with their performance.
	Motives	Motives of employees are aligned with the work and the work environment. Employees desire to perform the required jobs. Employees are recruited and selected to match the realities of the work situation.

From "Updating the behavior engineering model". *Performance Improvement, 42*(5),© 2003 byInternational Society for Performance Improvement. Reprinted with permission .

The Updated Behavior Engineering Model includes three factors associated with the environment:

- The first cell is *Environmental/Information*, which includes the information that should be available to the worker. The information must describe what the worker should do in that environment, how it should be done, and the worker needs feedback as to how the job is being performed. The worker needs to know what is expected as well as instructions on how to do the job.
- The second cell is *Environment/Resources*, which includes not only if the proper tools to do the job were available, but also how the job fit with other jobs and the arrangement of supervision in order to fit into the work schedule. It would be impossible for good job performance if the worker did not use the proper tools to do that job and to fit well into an organization.
- The third cell is *Environmental/Incentives*, which included both *carrots and sticks*. The worker needed to be properly rewarded for the work performed, including the chance for higher pay or other rewards for higher level of performance. This step also included the penalties associated with poor performance.

These were the most important three of the six factors to Gilbert. Gilbert believed that "When the support factors are not provided, however, performance cannot reach its potential even if the employees receive specialized training" (Dean, 1997, p. 47). Chevalier also explained that the Updated Behavior Engineering Model "focuses our attention on the distinction between environmental and individual factors that affect performance. Environmental factors are the starting point for analysis because they pose the greatest barriers to exemplary performance" (p. 9). In Gilbert's Leisurely Theorems, the position of the supervisor in the environment of the worker is emphasized: "We can view accomplishments at several levels of generality, and the

values we assign to these accomplishments at each level will be derived from the level just above them" (Gilbert, 2007, p. 112). This view is supported by the many observances that supervision often is the source of performance problems, rather than the solution to problems.

The three remaining cells of the six cells of the Updated Behavior Engineering Model are individual factors:

- The fourth cell is *Individual/Knowledge*, which is the first of the individual cells. The worker needs to have, in Gilbert's (2007) own words: "enough training to match the requirements of exemplary workers." (p. 30). Even if not trained, the worker needs to have availability of this training.
- The fifth cell is *Individual/Capacity*, which refers to worker and the place the worker fits into the organization. This means that the worker should be well-suited to the job through a good selection process and should have the capacity to learn. In addition, the worker should fit into a work process that permits the worker to reach peak proficiency and any aids that could be useful to the worker in reaching that proficiency should be available.
- The sixth cell is *Individual/Motives*, which refers to the willingness of the worker to work proficiently. It refers to the worker's desire as well as willingness to do a proficient job, as proficient as a top worker in the same job. According to Van Tiem, Moseley, and Dessinger (2012): "It was Gilbert's contention that motivation, the third factor related to the individual, will be high if all of the other five cells, especially if those related to the work environment are provided" (p. 175). While insufficient motivation may be present in a performance problem, it may only be a *symptom* of the problem, not the *disease*. By removing the real

> barrier to good performance, the *symptom* can disappear as a result of the *disease* being cured.

One of the most interesting results of examination of the Behavior Engineering model, as designed and modified over the years, was reported by Dean (1997): "We used Gilbert's behavior engineering model as the basis for an experiential activity called 'Where's My Biggest Performance Block?' (1994).....Results from the exercise consistently demonstrate that participants, regardless of their roles or level of responsibility, are likely to identify environmental factors rather than individual factors as blocks to better performance" (p. 52). According to Dean (1997), "Gilbert believed that any job supported in all six of the model's areas should 'carry a guarantee of high competence, provided that management was structured so as to really deliver these things and had a clear focus on the mission of the job in the first place' (1978)." (p. 49). An emphasis on providing the right focus for anybody wanting to change behavior was advanced by Binder (2005),

> Gilbert's focus on accomplishments (outputs of behavior) in what he called 'the world of work' shifted the fulcrum of analysis and performance improvement efforts toward the valuable products or deliverables resulting from the behavior of people at work, and away from behavior for its own sake (p. 3).

As Gilbert reasoned, shifting concentration away from behavior and toward accomplishments permits the individual to improve performance, with behavior either changing or being inconsequential to the result.

Applying the Behavior Engineering Model to Supervision

While the field of first-line supervisory preparation in general has been addressed in many venues, ranging from general training programs from the American Society of Training

and Development (ASTD) to individual facility training programs, only limited evidence can be found of using the Behavior Engineering Model to train first-line supervisors to help solve problems of individual employees in order to increase or regain productivity from the employee.

The Updated Behavior Engineering Model has been used, however, to train managers. For example, Andia (2008) advocated use of the Updated Behavior Engineering Model in a study of making the Model part of the curriculum for training of managers at a large manufacturing firm in the United States. The emphasis in the workshop-style training was applying the use of principles of the Behavior Engineering Model to problem-solving, including identifying information, resources, and incentives. Some training was conducted and the results reported were very positive in efficacy, including closing performance gaps and communicating with employees. Andia (2008) summarized:

> HPT practitioners have long appreciated the value and simplicity of using Gilbert's model to guide or diagnose performance. When senior managers complained that lack of effective performance management remained a concern, the model presented itself as a useful tool for each member of the organization. A next step could be to teach the model to new non-managerial employees to help them solicit from their managers what they need to perform as desired. In this way, the entire organization could be responsible for performance management, creating a culture of performance (p. 44).

While the intent of this study was to examine the effectiveness of knowledge of performance improvement principles and the Updated Behavior Engineering Model in the abilities of first-line supervisors to solve problems, the reaction of supervised employees was integral to determining the effectiveness, as recommended by Andia.

Important to applying the Updated Behavior Engineering Model is determination that a performance problem exists and the extent of the problem. A useful concept in such a needs analysis is the concept of a performance gap. According to Chevalier (2007), "the difference between where you are and where you want to be is the performance gap…" (p. 90). The performance gap should be measured before any improvement can proceed. An attendant goal should be set in order to begin the process of closing the performance gap. In setting that goal, care should be taken to choose a goal that is reasonable and attainable.

In setting goals for performance improvement, two other important concepts are how a goal is set and how the goal is measured. Gilbert (1978) described both, through the concept of the potential for improving performance (PIP). The potential for improving performance (PIP) was determined by making a ratio, conceptually, of the work of an exemplary performer to the work of a typical performer. "The lower the PIP of any person or group, the more competitive that person or group is" (p. 30). Gilbert also defined several viewpoints of performance that could influence setting of the performance improvement goal and that the view of the same performance can differ between observers as well as between different performers for the same viewer. Chevalier (2007) recommended that the goal be reasonable in order to "give the employee a target that can be met in short order and relatively easily, and which, when met, will provide the motivation to continue meeting higher goals" (p. 90). By not setting goals that are out of the reach of a worker, a worker may gain confidence and the desire to reach additional attainable goals.

Focusing on performance, the deliverable of a worker, analyzing the performance, and implementing change to affect performance positively should be the aims of a first-line supervisor. Knowledge of performance improvement principles and application of the Updated

Behavior Engineering Model, and using that knowledge, can form the basis of effective supervision. However, with the changing workforce of both the present and the future, the first-line supervisor should also be capable of utilizing cognitive skills and recognition of the learning patterns of workers as an essential part of the analysis. The future of first-line supervisors and Millenials alone are an impetus for first-line supervisor to increase their skills as problem-solvers.

Business Coaching

The First-line Supervisor as a Coach

In first-line supervisory preparation, coaching is an important way to help the first-line supervisor develop the interactive skills necessary for both analysis and intervention. Does the first-line supervisor listen well enough to understand the needs of workers? Can the first-line supervisor interpret the data gathered about the performance problem(s) to make conclusions about the performance gap(s) needing attention? Or is the first-line supervisor allowing past experience to impede analysis, assuming solutions that do not address the problem? Does the first-line supervisor have the best interests of the worker as a focal point for analysis and intervention? How does the first-line supervisor filter the information obtained? Will developing coaching skills help a first-line supervisor become more effective and efficient in improving productivity?

Coaching is a type of intervention that can be used as a method of improving employee performance. Coaching is defined by Bacon and Spear (2003) as "an informal dialogue whose purpose is the facilitation of new skills, possibilities, and insights in the interest of individual learning and organizational development" (p. xvi). Both Bacon and Spear (2003) and Gallacher (1997) described how coaching in business flowed from the sports-oriented form of coaching

and is more specific in nature, dealing with a part of the worker's career or job function, rather than the total context in which the person being coached is working. "Coaching has received considerable attention in recent years as the responsibility for employees' learning and development has been increasingly devolved to line managers" (Ellinger, Ellinger, & Keller, 2003, p. 435) The first-line supervisor is a line manager who can use coaching as a means of becoming a good communicator, as well as a means of becoming an effective performance problem-solver.

Many scholars describe types of research in terms of a continuum, with quantitative and qualitative research on the ends of the continuum and mixed methodology between the extremes. Similarly, a continuum can also be established for job training, with apprenticeship and mentoring near one extreme, no training at the opposite extreme and coaching and specific/general training within the continuum (Figure 6). Within this continuum, overlap can be extensive. For example, while identified separately, coaching is an element of apprenticeship and mentoring (to the left in the continuum) and supports training (to the right in the continuum).

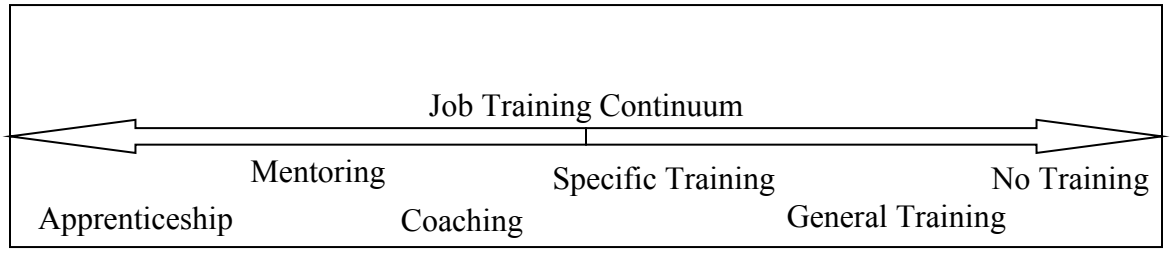

Figure 3. Job Training Continuum. Developed by author from experience in training in numerous organizations.

Apprenticeship is a method of job training that is less common in the modern world than in the past. Most collective bargaining units train new members with apprenticeship programs that last as long as five years. In the military, apprenticeship is referred to as striking, which is an

alternative to resident training. An apprentice would totally subject themselves to learning a craft or job, with a master having complete control of them. Mentoring was less binding, with a portion of a person's life being subjected to the molding influence of another person. While mentoring is commonplace in academia and some upper levels of business, the practice as performed by the first-line supervisor may be more easily understood as coaching.

Coaching

While mentoring is closer to the left end of the job training continuum, coaching is nearer the middle, though the two are close. The objective of coaching is to help people change. Further, Bacon and Spear (2003) defined coaching: "Coaching is intended to improve skills and ultimately workplace performance" (p. 9). Gallacher (1999) connected coaching to organizational goals: "Coaching evolved from athletic training models, clinical supervision in education, and staff development with educators. It has been used as a method for improving instruction and teaching strategies, experimenting with new approaches and techniques, problem solving, and building collegial relationships" (p. 201). The latter two uses described by Gallacher are very important in the business world as performance improvement results. Problem solving is part and parcel of first-line supervisory efforts, with problem solving being viewed as more applicable to processes than workers. For performance improvement to occur, problems in the job as well as in the performer of that job should be altered, with an obvious benefit to the organization, the first-line supervisor, and the individual. Buss (1998) described how valuable a coach enlisted by a small-business owner can be, including to: "improve their business skills, recalibrate their approaches to management, and, often, totally reboot and rebalance themselves as leaders on the job and in the home and community" (p. 1) A first-line supervisor, no matter how the position is described, should be a leader.

The characteristics of a number of different types of coaching are well described. While several kinds of coaching may be identified, such as cognitive and technical, several common and important attitudes toward coaching are also significant. These characteristics are: (a) that both coach and person being coached participate voluntarily, (b) that coaching is NOT associated in any way with performance evaluation, (c) that coaching is a continuing process, though it may be irregular in timing, and (d) that trust is maintained between coach and person being coached (Gallacher, 1999, p. 203). Most managers and first-line supervisors are coaches who also evaluate the performance of their people. Just as voluntary and involuntary mentoring were found to be different in outcome, so voluntary and involuntary coaching can have different results. While coaching from a parent is not voluntary on the part of the youngster, that coaching often becomes far more voluntary as the youngster matures, recognizing the value of the coaching.

In addition, the characteristics of a good coach are also well described. Gordon (2007) lists the following attitudes required of a good coach: "focus on winning, qualified to coach, *We* (attitude), empowering, and solution-focused" (p. 276). Stevens and Frazer (2005) added more: "Good coaches provide expert analysis of an employee's activities with unbiased and candid feedback. Perspective, objectivity, and candor are equally critical attributes of an effective coach" (p. 12). Coaching can make any supervisor more successful as a problem-solver by helping them through the decision-making process, essential to problem-solving.

Adaptive Coaching

A particular type of coaching, called adaptive coaching, is particularly suited to this research with first-line supervisors. Coaching can become closer to therapy if not centered on the person being coached. The parallels between the sports coach and the business coach are

well described in the extensive literature on coaching. One fact that emerges from that literature is that the highly effective sports coach can adapt coaching style to individual players being coached. The first-line supervisor who wants to become a good coach in industry should have good coaching skills, but also should adapt coaching style to help a particular worker improve productivity in a given task. In other words, the coach should adapt the coaching style to fit the worker being coached. This is the essence of adaptive coaching and the applicability of the coaching style necessary to developing performance improvement skills in first-line supervisors.

Adaptive coaching may be defined in another, equally important way, "adapting occurs in situ as both coach and client discover what works best" (Bacon and Spear, 2003, p. 24). Adaptive coaching is particularly suited to two tasks: allowing the researcher to become a better coach for each first-line supervisor and allowing the first-line supervisor to learn how to be an effective adaptive coach to workers. Bacon and Spear (2003) provided a further explanation: "…some clients want to be given advice and direction; others (most others, in fact) prefer the coach to ask questions and guide but not direct them" (p. xxxiii). Adaptive coaching can be the preferred method of coaching for supervisors in any organization at any level, but adds particular value for supervisors in application of performance problem solving.

The essential elements of adaptive coaching are (a) determining the client's needs, (b) determining the client's preferences for coaching, (c) listening to and questioning the client, (d) sharing observations with the client, and (e) encouraging the client by pushing and pulling to obtain objectives (Bacon & Spear, 2003, p. 1). Essential to this process are listening to the client, asking probing questions to not only learn what the client is thinking but also what the client needs, and focus on the client (Kimsey-House, Kimsey-House, Sandahl, & Whitworth,

2011, pp. 11-12)). These worthy goals of coaching are also the goals of coaching to help supervisors develop their supervisory skills.

Experiential Learning

Experiential learning is learning that occurs based upon the experience of the learner and emphasizes the role that experience has in the learning process (Kolb, Boyatzis, & Mainemelis, 1999, p. 2). Kolb et al go on to state: "Another reason the theory is called 'experiential' is its intellectual origins in the experiential works of Dewey, Lewin, and Piaget. Taken together, Dewey's philosophical pragmatism, Lewin's social psychology, and Piaget's cognitive-developmental genetic epistemology form a unique perspective on learning and development" (p. 2). This research is a combination of the two, experiential learning of first-line supervisors to recognize problems and then experience in intervening to improve performance.

Transfer of Learning

Can First-line supervisors Transfer Knowledge to Improve Worker Performance?

One of the largest challenges facing anyone who desires to increase performance in the workplace is that any knowledge or skills gained in an intervention such as training is the actual use in the workplace of the knowledge or skills gained. As advanced by Broad (2005), a leading authority on transfer of learning,

> Measures of performance following many training and other interventions have shown very low levels of payoff…Yet there is substantial research and best practice experience that shows how to raise performance outcomes significantly. This can happen when organizations are viewed as complex systems with important stakeholders who can make or break the desired outcomes (p. 1).

Many trainers assume that, when given information, trainees will be able to use the information provided as intended. Numerous anecdotes might be found disproving the assumption of these same trainers. A number of different literature searches and research efforts supported the view that training was not being transferred as was commonly assumed up until the 1950s. These are compiled in Table 4 and Appendix B.

Table 4.

Low Levels of Transfer of Training to Desired Performance

Researcher(s), Date	Focus of Research	Summary of Findings
Fleishman, Harris, and Burtt (1955)	Loss of desired behavior change following training	Study of International Harvester foremen, trained in leadership principles and techniques. Following training, most foremen exhibited desired behavior. After several months, most had reverted to original behavior. The few who continued to demonstrate behaviors worked for supervisors who also demonstrated the desired behaviors.
Mosel (1957)	Minimal impact of training	Training often "makes little or no difference in job behavior."
Newstrom (1985)	Decrease in training content applied over time following training; barriers to transfer of learning to performance	Study of perceptions of learning specialists (members of ASTD). On average, they perceived: (1) Only 40 percent of training content was applied to job immediately following training, (2) Only 25 percent of content still applied to job after six months, (3) Only 15 percent of content still applied to job after one year, (4) Lack of reinforcement by supervisors on the job, (5) Difficulties in the work environment, (6) Non-supportive climate in the organization, (7) Learner perception of new skills as impractical, (8) Learner discomfort with change, (9) Separation from instructional provider, (10) Poor design and delivery of training program, and (11) Negative response to new behaviors by co-workers.
Baldwin and Ford (1988)	Survey of literature and research on transfer of training	Among other findings: Not more than 10 percent of the estimated $100 billion spent each year on training by American industry actually resulted in transfer to the job.
Kotter (1988)	Factors inhibiting success of management	In a survey of top executives, more than half identified two factors that inhibited the success of training to improve performance of managers: (1) lack of involvement by top managers in the change development process (71 percent of

Researcher(s), Date	Focus of Research	Summary of Findings
	training	respondents), and (2) new improvement efforts centralized at top echelons of the organization but not accepted by lower-level participants (51 percent of respondents).
Tannenbaum and Yukl (1992	Low levels of transfer of learning	In a review of the literature: transfer of learning to job performance was generally significantly lower than desired, with relatively few learners (as low as 5 percent) affirming that they had applied what they had learned to their job performance.
Stolovitch (2000)	Low transfer rates for training as sole intervention	In a study of best practices: Training alone is usually not effective in achieving on-job application. Low transfer rates for training alone range from 10 to 30 percent "with most on the low end."

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Training will have little chance of success if not supported by the manager and the work environment (Chevalier, R., personal communication, September 24, 2012). This conclusion is also supported by other authors. Grossman and Salas (2011) asserted: "Situational cues include things such as manager goals, peer support, equipment availability and opportunity to practice trained skills" (p. 112). Martin (2010) examined a training program for over 200 first-line supervisors at a large manufacturing organization in the Midwestern United States. This research found that:

> (a) Trainees in a more favorable workplace environment showed greater combined performance improvement than those in an unfavorable climate and (b) The results of this study suggest that follow-up programs should be designed to address both the immediate and general organizational environments. Care should be taken to help ensure that peers and immediate first-line supervisors help trainees put the skills to work (p. 96).

Training may be more likely to be transferred to trainees successfully if a few important steps are taken. The first step is to define transfer of training so that, when training is performed as an

intervention, the likelihood of transfer of that training to the job is much more likely to occur. Broad and Newstrom (1992) defined transfer of training: "Transfer of training is the effective and continuing application, by trainees to their jobs, of the knowledge and skills gained in training – both on and off the job" (p. 6). The explicit goal of transfer of training is then, by design, built into the training.

One way to start to build a solution to the problem of transfer of training is to think of any organization, public or private, as a complex system, as described elsewhere in the Review of Literature. Senge, who has written extensively about the subject, called systems thinking the *fifth discipline* that was needed for organizations to become training organizations (Senge, Kleiner, Roberts, Ross, & Smith, 1994). Performance improvement is more likely to occur if supervisors use the fifth discipline to become better problem-solvers.

Qualitative Research

Qualitative research may be described as a method used to understand people. Gall, Gall, and Borg (1993) advanced the idea that: "The purpose of qualitative research is to develop an understanding of individuals and events in their natural state, taking into account the relevant context" (p. 194). Gall et al went on to distinguish between qualitative and quantitative research: "Studies that employ various methods of inquiry are called 'qualitative' research because their measurement systems usually involve verbal descriptions and interpretations rather than statistical analysis of numerical data" (p. 194). Stake (1995) described a "distinction between explanation and understanding as the purpose of inquiry" (p. 37). A particular advantage of the application of qualitative research is the potential to understand the interrelationships between people, especially with regard to the complexity of and differing nature of those relationships.

Qualitative research may take many forms, with the people and problem to be understood driving the selection of the form. Merriam (2009) described the various forms of qualitative research:

> We can engage in this process to contribute to the knowledge base in a field (pure research), improve the practice of a particular discipline (applied research), assess the value of something (evaluation research), or address a particular, localized problem (action research). (p. 4)

Of the forms described by Merriam, action research is especially suited to qualitatively describe how first-line supervisors can improve performance of workers in the workplace at the Light Manufacturing Company (pseudonym).

Because qualitative research permits understanding of people in a specific setting, their reaction to changes that they confront, and interpretation of both, it is important to focus on understanding as an objective of the research (Patton, 1987, p. 1). Creswell (2009), describing the requirements for a qualitative researcher, also described the dimensions of qualitative research:

- Qualitative researchers tend to collect data in the field at the site where participants experience the issue or problem under study…
- Qualitative researchers typically gather multiple forms of data, such as interviews, observations, and documents, rather than rely on a single data source…
- Qualitative researchers build their patterns, categories, and themes from the bottom up, by organizing the data into increasingly more abstract units of information…
- Qualitative research is a form of interpretive inquiry in which researchers make an interpretation of what they see, hear, and understand…

- Qualitative researchers try to develop a complex picture of the problem or issue under study" (pp. 175-176).

Qualitative research requires thorough description and attention to each aspect of the research subjects as well as the environment of those subjects.

Qualitative research should align the topic of the research with conduction of the research. Both Creswell (2003) and Stake (1995) emphasize that what is known, what is to be discovered, and methods of discovery should be suitable to the research questions as well as to the researcher. In addition, the research question should be stated in such a way that qualitative research methodology might be able to be a means of answering the question.

Validity and Reliability

Both validity and applicability are important to qualitative research. Guba and Lincoln (1985) advance the notion that: "The ultimate test of the validity of any inquiry findings is that they should describe reality exactly" (p. 86). Merriam (2009) further states: "The more important question for qualitative research is whether the results are consistent with the data collected" (p. 221). The data, how the data was collected, and the interpretation of the data by the researcher are important to the validity and reliability of qualitative research.

Validity

What is validity? According to Borg, Borg, and Gall, "A goal of those who conduct and use educational research is to accumulate evidence over time that can be used to validate, or to disprove, commonly held notions about learning and learners" (p. 8). Reliability of measurement depends upon validity of measurement.

The goal of qualitative research is to produce a result that can be expanded upon and adapted to be valid and reliable for other participants in other locations and organizations. Any

person who reviews the research and the procedures used to produce this research should have confidence that what is intended to be measured is measured and that the measurements are accurate. Validity is important in design of research because valid research actually proves what the research claims to prove.

Two types of validity are important for tool development - content validity and face validity.

Content Validity. Content validity asks: Does the assessment measure what it is supposed to measure? Is the choice of research data collection plan appropriate to cover a balance of the concepts within the research? Content validity is necessary to attest to the appropriateness of the research study.

Content validity has a depth that face validity lacks. According to Branigan and Watson (2009), "Content validity considers whether a scale has included all the relevant and excluded irrelevant issues in terms of its content" (p. 3240). Content validity can be viewed as the critical view by a group of experts. Emphasis on content validity is emphasis on what experts believe to be valid and invalid.

Face Validity. Face validity focuses on whether the instrument appears useful and meaningful to those who will be using the instrument. In other words, does the instrument look appropriate at face value? Face validity involves reasonableness for the research subjects.

Face validity is identifying that an instrument appears to measure what it is supposed to measure. Face validity can be very subjective, in that two very different views of validity may be taken by two different evaluators. The view of a person with vast experience as a worker would likely be considered more valid than the view of a person with far less experience. If more than one experienced person expresses similar views of validity, the face validity of an

instrument tends to confirm the validity of the instrument. As Branigan and Watson (2009) stated:

> Obviously, the more people and different groups related to the subject who are involved in the process the more acceptable it is likely to be. An assessment of face validity is important because acceptability of a scale is important to its utility (p. 3240).

Reliability. Reliable data is data that is obtained consistently.

A number of approaches may be used to attempt to obtain reliability and validity of qualitative research. Merriam (2009) describes strategies to promote reliability and validity for qualitative research:

1. Triangulation – multiple sources of data and data collection methods
2. Member checks – taking data and initial interpretations back to the people from which they were derived and asking if they are plausible
3. Adequate engagement in data collection – spend enough time gathering data and not neglecting seemingly negative or non-supportive data
4. Researcher's position – self-reflection so that researcher biases due to assumptions, worldview, theory, or influences of the study are minimized
5. Peer review, examination – discussions with colleagues regarding the process, relationships between emerging findings, and possible interpretations
6. Audit trail – detailed record-keeping during the research
7. Rich, thick descriptions – providing written context for all data collection procedures and processes

8. Maximum variation – purposefully trying to find variations or differences in sample selection to permit a wider range of application of the findings of the research to others (p. 229).

Use of most or all of these methods should be part of the research design when using qualitative research methodology.

Action Research

What Is Action Research?

Action research, in the history of research, is an infant, *arriving* after many centuries of practice of quantitative research and a number of decades of practice of qualitative research. The engineer viewed as the father of scientific management, Frederick Taylor, focused on how work should be performed efficiently, in order to save time as well as money. Van Tiem, Moseley, and Dessinger (2012) asserted that Taylor's "Scientific management principles include: authority based on knowledge instead of position, the first wage incentive system, breaking down tasks into smaller components and creation of a production expert, laid the foundation for the modern assembly line" (p. 12). The economic benefits of the assembly line are well known and attributed to the concepts and research of Taylor.

The term *time-motion study* is frequently associated with Taylor. But a facet of the work of Taylor has been ignored by many, the importance of understanding the job to be done by a worker, knowledge. The first-line supervisor is in a unique position to fully understand the context of a worker in the workplace. By extension, the first-line supervisor then possesses a particular knowledge that higher levels of management may not possess and be in a unique position to improve worker performance.

A counter-view to Taylor's Scientific Management concepts was held by Kurt Lewin, a German-born psychologist, who viewed individual workers as part of a social structure, influencing the form of the structure as well as being influenced by the structure. After returning to society following World War I in Germany, Lewin was especially concerned by the plight of the minority factory worker and the value that social action would be to each worker. Lewin believed the performance of these workers depended upon their own autonomy in performing the actions that formed the job of the worker. Rather than experiment with workers, as did Taylor, Lewin firmly believed that each worker would find the best way to perform the actions required of them. By interacting with individuals, the worker, not the engineer, can develop the job into one that is more productive and enjoyable to the worker than a job based upon scientific management.

In the 1940s in the United States, Lewin further developed the concept of action research, applying principles of social interaction that could produce results. Lewin (1946) described a

> type of action-research, a comparative research on the conditions and effects of various forms of social action, and research leading to social action. Research that produces nothing but books will not suffice…will have to include the whole range of descriptive fact-finding in regard to social bodies. Above all, it will have to include laboratory and field experiments in social change(p. 144).

Lewin experimented with the idea of action research, even going so far as to state that, according to Adelman (1993), "No action without research; no research without action" (p.8). Rather than confine research to observation or experimentation, Lewin wanted to include both, letting the resulting actions lead the research. As described by Adelman (1993), "The pioneering action

research of Lewin and his associates showed that through discussion, decision, action, evaluation and revision in participatory democratic research, work became meaningful and alienation was reduced" (p. 15), two common problems with management under Taylorism.

While many scholars have linked Lewin to the origination and development of action research as a methodology in the middle of the twentieth century, many other researchers have expanded and adapted part of Lewin's initial views relative to social structures. However, two statements by Lewin are essential to understanding action research. As stated by Swanson and Holton (2009), "'Nothing is as practical as a good theory,' and 'The best way to understand something is to try to change it': these two statements credited to Lewin reflect the epistemic assumptions of action research" (p. 375). Change through action is the basis of action research as used for performance improvement.

Other views about action research have evolved from Lewin's philosophy. Coghlan and Brannick (2010) emphasized that, in addition to the action(s) being examined, that action research is a collaboration between equal partners in the action and measurement of the action, research is concurrent with the action, and action research is not only a set of events but the act of problem solving at the same time (p. 4). Coghlan and Brannick further stated that "Action research works through a cyclical four step process of consciously and deliberately (1) planning, (2) taking action and (3) evaluating the action, (4) leading to the further planning and so on" (p. 5). Action research may include further steps as the research plan needs to be changed as a result of the outcome of the previous action taken.

A similar process was established by Stringer (2014) in the form of a framework for conducting action research:

Look

- Gather relevant information (Gather data)
- Describe the situation (Define and describe)

  Think
- Explore and analyze: What is happening here? (Analyze)
- Interpret and explain: How or why are things as they are? (Theorize)

  Act
- Plan: Define a course of action based on analysis and interpretation
- Implement: Implement the plan
- Evaluate: Asses the effectiveness of actions taken (pp. 8, 9)

Action research was defined by Coghlan and Brannick (2010) as "research *in* action, rather than research *about* action" (p. 4). This statement alone might be construed to compare action research with case study research. An important part of any case study is for the researcher to maintain detachment from the case, so that data collect not only does not reflect any bias of the researcher, but makes the researcher largely irrelevant, at least as part of the data. In action research, the researcher is directly involved with the participants, collaborating with the participants to take action and then to analyze what occurred. If deemed necessary for the sake of research, further action may result from analysis of data from the first action.

Action research is also distinguishable from other forms of qualitative research by its nature. Shani, Coghlan, and Cirella (2012) described the dimensions of action research:

[T]he critical themes that constitute action research [are]: that as an emergent inquiry process it engages in an unfolding story, where data shift as a consequence of intervention and where it is not possible to predict or to control what takes place. It focuses on real organizational problems or issues, rather than issues created particularly for the purposes of research. It operates in the

people-in-systems domain and applied behavioral science knowledge is both engaged in and drawn upon. Action research's distinctive characteristic is that it addresses the twin tasks of bringing about change in organisations and in generating robust, actionable knowledge, in an evolving process that is undertaken in a spirit of collaboration and co-inquiry, whereby research is constructed *with* people, rather than *on* or *for* them. (p. 51). Another distinction between traditional forms of research and action research was delineated by Stringer (2014). Stringer (2014) points out that traditional methods of inquiry, whether quantitative or qualitative in nature, start from a central question or hypothesis and proceed to attempt to answer the question or resolve the hypothesis.

> One of the tasks of action research…is to ensure that the ways that stakeholder describe and interpret events become the central focus of the research process. These different perspective consequently become subjects of interaction and negotiation as people creatively explore ways of conceiving the situation that assist them in resolving a problem (p. 39).

These dimensions may be used to formulate the use of action research.

Using Action Research

Action research permits testing a viewpoint and then adjusting application to make the viewpoint more informed by experience. The assumption for this research is that a first-line supervisor can use knowledge of the Performance Improvement/HPT Model and the Updated Behavior Engineering Model to analyze performance problems in order to take action that will reduce the problem, closing a performance gap exemplified by the problem. Use of these Models in the form of the job aid called Performance Problem Tool (Figure 1 and Appendix A) at a facility is a focus of this research project. Action research is an appropriate method of

testing the value of this job aid and the underlying assumptions as well as content of the job aid itself.

In using action research, the process is expected to begin with some degree of uncertainty that improves with action. Coghlan and Brannick (2010) described this characteristic:

> While all research demands rigour, action research has to demonstrate its rigour more particularly. This is because in action research you typically start out with a fuzzy question, are fuzzy about your methodology in the initial stages and have fuzzy answers in the early stages. As the project develops, your methods and answers become less fuzzy and so your questions become less fuzzy (p. 144).

An important factor in action research then is to thoroughly document the process of elimination of the fuzziness in the progression through action research cycles. Stringer (2014) amplified this factor: "Action research enacts localized, pragmatic approaches, investigating particular issues and problems in particular sites at particular moments in loves of interacting individuals and groups" (p. 61).

Use of action research in education elicited a similar view from Borg, Gall, and Gall (1993). In comparing action research to other forms of qualitative research, Borg etal (1993) described how an action researcher conducts their research: "Action researchers, by contrast, plan their procedures more loosely, make changes during the action phase of the study if they appear likely to improve the practical situation, and complete the study fairly quickly. Little attention is paid to control of the situation or elimination of sources of error or bias. Because the researchers tend to be personally involved, bias is typically present" (p. 398-399). While the action researcher attempts to remain objective and concentrate on the actions and reactions of the

participants, action research is an intervention and the researcher affects the action by maintaining focus on the goals of any action research.

Shani and Passmore (1985) defined the action research process in terms of four factors: context, quality of relationships, quality of the action, and outcomes (p. 439). The context consists of the current as well as historical setting of the action research, including goals and culture of the first-line supervisors, employees being supervised, and management of the organization. The readiness of the first-line supervisors and the facility to participate in the actions, and environmental factors, including the economy and political factors influencing the action, will be assessed and included in planning of the research. The quality of the relationships between researcher and first-line supervisors, including trust and transparency, is essential to generate the data necessary to measure the changes, if any, resulting from the action. For this research, the first-line supervisors will be coached by the researcher to help them gain knowledge of the Updated Behavior Engineering Model and then increase skills in performance problem-solving by using the job aid, based upon the Updated Behavior Engineering Model. A part of the experiential training will include practice in solving performance problems that are typical to organizations.

Quality of action is dependent upon the planning and congruence of interests between the researcher, first-line supervisors, and organization that are necessary to permit proper measurement and adaptation of the research to meet the needs of all. While different first-line supervisors (e.g., operations supervisors as compared to maintenance or clerical supervisors) might encounter different problems that are directly job-related, such as making failure to follow safety procedures properly, they will face many similar personnel problems, such as absenteeism. Outcomes are important because of the desire of stakeholders for sustained high

level of performance as reflected by exemplary performance. Some of these outcomes may be tangible and easily measureable, such as lower absenteeism or fewer lost-time accidents; other outcomes may be intangible, such as more and better teamwork and morale.

During this research, first-line supervisors were expected to practice using the knowledge and skills they have to solve real problems, using the Performance Problem Tool. First-line supervisors are also expected to provide feedback that may be used to improve the Performance Problem Tool. Feedback from the first-line supervisors as well as from other stakeholders, before commencement and after completion of the action research, was utilized to improve the Performance Problem Tool as the action research progresses. In the research, an emphasis was placed on helping first-line supervisors become effective performance problem solvers, including improving many intangible qualities of leadership. One of the most important of these intangible qualities is the buy-in from workers. Workers are much more likely to improve performance if the reason for improvement is acceptance of the value of exemplary performance.

Action research is not performed in isolation. As Coghlan and Brannick (2010) observed: "In any action research project there are multiple action research cycles operating concurrently" (p. 10). Each action research cycle necessarily includes interaction between researcher and supervisors as well as interaction with others that are not directly related to the researcher or supervisors. In addition, data collection in the form of documents, notes, and artifacts, as well as analysis of the data during the action research cycle, inform the participants as to changes needed to start the next cycle. As presented by Coghlan and Brannick (2010): "One cycle is the cycle…of constructing, planning, taking action in relation to the achievement of the project's aims…The second cycle is a reflection cycle which is an action research cycle about the action research cycle" (p. 11). As described by Argyris, Putnam, and Smith (1985):

"Learning new actions and new theories-in-use can be understood as a process of unlearning one set of rules and learning another" (p. 368). This second cycle may be viewed as meta learning, or "learning about learning" (Coghlan & Brannick, 2010, pp. 11-12). While meta learning may not be an expressed goal of action research, meta learning may be viewed as essential to the application of action research.

Reflection is an important part of the action research evaluation because it permits participants and the research to step back from the action to elicit the meaning of the results of the action. Raelin (2008) described reflection:

> Reflection constitutes the ability to uncover and make explicit to oneself what one has planned, observed or achieved in practice. It is concerned with the reconstruction of meaning, in particular, the process of inquiry, leading to an understanding of experiences that may have been overlooked in practice" (p. 84).

Raelin went on to argue that "reflection becomes all the more critical at the collective level" (p. 84). Explicit reflection by each participant shapes the feedback necessary to begin a subsequent action research cycle.

With reflection comes evaluation of an action research cycle just completed. Coghlan and Brannick (2010) described evaluating action as examining the

> outcomes of the action, both intended and unintended …with a view to seeing:
>
> - If the original constructing fitted
> - If the action taken matched the constructing
> - If the action was taken in an appropriate manner
> - What feeds into the next cycle of constructing, planning and action (p. 10).

This evaluation, conducted on both individual and cohort basis, provides the basis to construct the subsequent action research cycle.

Data in Action Research

Data in qualitative research may be anything observed, heard, or seen. Merriam (2009) defined data: "Data are nothing more than ordinary bits and pieces of information found in the environment" (p. 85). Patton (2002) explained: "Qualitative data consists of direct quotations from people about their experiences, opinions, feelings and knowledge obtained through interviews; detailed descriptions of peoples activities, behaviors, actions recorded in observations; and excerpts, quotations, or entire passages extracted from various forms of documents" (p. 4). About data collection in qualitative research, Merriam (2009) stated: "…data collection is about asking, watching, and reviewing (p. 85)". These definitions emphasize the role of the researcher in qualitative research.

Data in action research may be described in similar terms. Argyris, Putnam, and Smith (1985) called talk data and emphasized that it is the window into the logic of action. "…[W]e must elicit data on what individuals actually say and do as they interact, as well as data on what they are thinking and feeling at the time. It is from such data that we can reconstruct the rules or propositions that must be in individuals' heads to produce the behaviors and consequences that we see" (p. 239). Coghlan and Brannick (2010) identified the source of data in action research:

> Data are being generated not only through participation in and observation of teams at work, problems being solved, decisions being made and so on, but also through the interventions that are made to advance the project. Some of these observations and interventions are made in formal settings such as meetings and interviews, many are made in informal settings over coffee, lunch and other recreational occasions. (p. 74)

Data, however generated, should be collected and used as an essential part of action research.

However, more data exists for action research than talk. Data, in the form of information may also be used in action research. Coghlan and Brannick (2010) identified this as secondary data: "Secondary data are numeric and textual data there were developed for some purpose other than helping to solve the action research question in hand. You need to evaluate these data on the basis of their relevance to the research question, their availability and their accuracy" (p. 75). Secondary data should be collected from all available sources, though the applicability of this data should be evaluated for suitability to aid in answering the research question.

> And how is data gathered in action research? Coghlan and Brannick (2010) asserted that: In action research, data comes through engagement with others in the action research cycles. Therefore, it is important that acts which are intended to collect data are themselves interventions. So asking an individual a question or observing him at work is not simply collecting data but is also *generating* learning data for both the researcher and the individual concerned. Every action, even the very intention and presence of research, is an intervention and has political implications across the system. Accordingly, it is more appropriate to speak of data *generation* than data gathering. (p. 74)

Data generation should be fully documented and used in action research in order to guide the action.

Literature Review Summary

This literature review surveys ten major topics that form the foundation for this research: (a) organizations as systems (b) supervisors and problem-solving, (c) Performance Improvement and the Human Performance Technology Model, (d) Behavior Engineering Model, (e) business

coaching, (f) experiential learning, (g) transfer of learning, (h) qualitative research, and (i) action research.

The literature reveals that treating organizations as systems permits a systematic approach to be used to analyze an organization. Stakeholders are identified as those members of the organization who have direct interest in the outcomes of any projects that will change the organizational environment as well as results of normal operation of the organization. The importance of stakeholder involvement and influence are emphasized in the literature and are important factors in the success of this research project. The methodology of this research project includes efforts to involve stakeholder on each level of the organization at which research is conducted before, during, and after the project. Measurement of the degree of support is also an integral part of the research.

As a review of the literature reveals, preparation of supervisors to assume the role of a supervisor is limited, at best, and incomplete in scope for the limited training being performed. While a major duty of supervisors is to ensure competent performance of workers, preparation of a supervisor to perform this function was not apparent in the scope of training of the few organizations that offer training in supervision to supervisors. Yet improvement in performance of workers remains the stated goal of most organizations and, as supported by the review of literature, can be nothing if not more important in the future of organizational development.

The Performance Improvement/Human Performance Technology Model may be used as a template to analyze performance of an organization, a unit of an organization, and the individuals in the organization. Emphasis in the literature is placed on using the Model to perform performance analysis in order to determine if a performance gap exists and the potential cause or causes of the performance gap. The Model also provides a framework for attempting to

reduce the performance gap through selection and design of interventions, implementation of the interventions, and maintenance of the interventions over time. The Model places emphasis on the importance of evaluation of all phases of the performance analysis as well as the implementation of the interventions.

The literature also reveals the importance of use of the Performance Improvement/Human Performance Technology Model on an organizational level in order to apply the Model on an individual level. Analysis of the organization to determine desired performance and analysis of the business environment to determine actual performance are a part of performance analysis to estimate a performance gap. When performed on an organizational level, the Model provides the overall context to apply the Model on an individual level.

The Performance Problem Tool, a job aid developed for and used in this research, was designed using the Performance Improvement/Human Performance Technology Model, including performance analysis, gap analysis, cause analysis, intervention, and evaluation. An abbreviated form of the Performance Problem Tool is illustrated in Figure 1 and the Performance Problem Tool is illustrated in Appendix A. The Tool permits determination of how the individual performance problem fits into the organizational context. One goal of this study was to change the Performance Problem Tool to fit the needs of the participating first-line supervisors through action, while preserving the underlying principles of performance improvement.

The literature review also provides the basis of focus on the principles of individual performance improvement for this research. The Updated Behavior Engineering Model provides the framework for improving performance. The Model has been used by performance improvement specialists for several decades with positive result. Important in the process of applying the Model is the importance of analyzing the performance gap and setting reasonable

goals to close the performance gap. Development of a job aid for supervisors, based upon the Updated Behavior Engineering Model, to use provides a method by which a supervisor can solve the problems encountered with personnel performance.

Attendant to use of such a job aid as the Performance Problem Tool is coaching to ensure that the actions of first-line supervisors in using the job aid achieve the best result and that knowledge of how to achieve exemplary performance is transferred to the workers being supervised. Adaptive coaching, deemed the best method of helping supervisors progress, fits the goal as well as the strategy of helping first-line supervisors become better performance problem solvers.

Experiential learning, the learning that an individual has based upon experience, was defined in the literature. On-The-Job Training (OJT) is described as a way of providing some experience in problem-solving to individuals and is a part of this research project. Evaluating the experience of each supervisor taking part in this research is included for each individual as a part of the research design.

The review of literature examined many factors that lead to success, as well as failure, in the transfer of learning to use in the workplace. One of the most important of these factors was identified as level of support given by stakeholders, peer as well as managerial. As stated by Chevalier: "My experience with evaluating sales training is that 50% of all sales training wouldn't be necessary if the sales managers did their jobs. What if the managers and the work environment they create are part of the problem?" (Chevalier, R., personal communication, September 24, 2012). While applying the Performance Improvement/Human Performance Technology Model would be informative to pursue, this research focuses on the particular

problem of first-line supervisors improving problem-solving capability, a smaller part of the overall performance improvement problems associated with management.

Qualitative research was defined in the literature as a method of explaining in a thorough manner, and in understandable terms, an individual or a group of individuals and their actions and reactions in their surroundings. Use of description of people and what those people do as well as where they do it are important to understanding and analyzing whether supervisors can improve performance of workers. Description provides a means of making decisions by participants, evaluating decisions and actions of other people, and the change that occurs in people as a result of their decisions and feedback information. This method of research provides far more detail that is important to and causes action as well as change in action of individuals. Qualitative description makes use of artifacts as well as data encountered by the researcher in analysis of what the researcher observed, thought, and felt during the research. A rich, thick description *paints a picture* for the outside reviewer of the research.

Action research permits a cycle of change, evaluation of the change, and improvement in the method of change to be repeated in order to improve. This method of research was selected because it permits the participating first-line supervisors to develop skills as performance improvers by means of solving performance problems. This method also refines the job aid, the Performance Problem Tool (Appendix A), adapting it to the needs of the participating first-line supervisors to solve performance problems. Further, meta learning provides a means of refining action research as a process of performing action research.

Based upon the review of literature in these topics, Chapter 3 details the methodology for the research in worker performance problem-solving by first-line supervisors.

CHAPTER 3: METHODOLOGY

Introduction to Methodology

Purpose of the Study

The purpose of this study is to examine how first-line supervisors at the Light Manufacturing Company (pseudonym), trained in basic principles of performance improvement and coached in applying the principles, can improve performance of workers. Action research provides a means of studying how those supervisors may implement their newly acquired knowledge and skills to solve worker performance problems. Action research methodology was also applied to development of the job aid, the Performance Problem Tool, for use by the first-line supervisors in the workplace in solving performance problems.

Research Questions

This study addresses the following research questions that focus on the influence of knowledge of and coaching of first-line supervisors in performance improvement on workers at the Light Manufacturing Company (pseudonym):

- Do first line supervisors improve worker performance using the basic principles of performance improvement and the job aid?
- How do first-line supervisors implement training and coaching in the basic principles of performance improvement in order to solve worker performance problems?

Research Approach

The approach of this study to answering the research question for participating first-line supervisors of the Light Manufacturing Company (pseudonym) is based upon the action research approaches described by Coghlan and Brannick (2010) and Stringer (2014) and the action science principles of Argyris, Putnam, and Smith (1985). Action research permits study of

actions by participants to develop and improve their skills in recognizing, analyzing, and solving worker performance problems. Using basic knowledge of performance improvement, first-line supervisors can develop skill by practice in application of the knowledge. Progression as a problem-solver not only requires action in application of knowledge, but reflection on action to refine and improve problem-solving ability. Thus, action research was chosen because the goals of this research coincide with the general goals of action research as a field of research. In particular, the action research designs of Coghlan and Brannick (2010) and Stringer (2014), of the different models in the field, are directly applicable to this study because of the centrality in the design of unifying the purpose of improving performance problem-solving of first-line supervisors with actions to achieve that purpose.

The design of this study has four basic parts: (a) Developing the context and purpose of the action research, (b) Designing initial action research cycles for both individual supervisors and the job aid (the Performance Problem Tool), (c) Adjusting action research cycles as a result of coaching and reflection of participants and researcher, leading to subsequent cycles, and (d) Describing and analyzing actions during the study, including the meta learning that was revealed by the study.

Research Approach – Context and Purpose of Action Research

The context and purpose of action research not only describe *where we are* but also *where we want to be*. Coghlan and Brannick (2010) recommend asking several questions in establishing context and purpose: "Why is this process necessary or desirable? In terms of assessing the external context, what are the economic, political and social forces driving change? In terms of internal forces, what are the cultural and structural forces driving change?" (p. 8).

Answering these questions helps to establish *where we are*. Establishing a purpose for the action research defines *where we want to be*.

Context

The Light Manufacturing Company (pseudonym) produces a product for a specific retail market, which has been negatively affected by the national economic downturn beginning in 2008. According to the Light Manufacturing Company (pseudonym) annual report slight losses in market share during the first three years of this downturn led to restructuring to position the business for growth and market share gains as our market segment does recover. Restructuring has included addition of continuous quality control personnel, training of supervisory personnel in leadership principles, and modernizing of equipment and production quality monitoring. According to the Light Manufacturing Company (pseudonym) annual report, this investment has already begun to show returns through lower material and labor costs as well as increased capacity.

Training of personnel in leadership principles was performed by the researcher for this study before the research for this study was begun. Instruction in performance improvement principles was included as an integral part of the training presented to twenty-four (24) personnel, including four (4) managers and twenty (20) supervisory personnel. Development of management personnel to solve performance problems had not heretofore been a part of the restructuring effort at Light Manufacturing Company (pseudonym).

Purpose

The purpose of this action research study is to examine how first-line supervisors at Light Manufacturing Company (pseudonym), trained in basic principles of performance improvement and coached in applying the principles, can improve performance of workers. Action research

provides a means of studying how those supervisors may implement their newly acquired knowledge and skills to solve worker performance problems. According to Stringer (2014): "Change, the desired outcome of action research, therefore derives from the here-and-now ideas and concepts taken from the taken-for-granted life-world of the participants" (p. 63). Action research methodology may also be applied to development of the job aid, the Performance Problem Tool, to use by the first-line supervisors in the workplace in solving performance problems.

A first-line supervisor that is effective in solving performance problems may be defined using criteria established by experts in performance improvement. Van Tiem, Moseley, and Dessinger (2012) stated that a "performance improvement practitioner will be able to: (1) Analyze the current situation, determine the desired outcome, and describe the cause of the performance challenge and (2) Determine options to improve the situation, select, design, and develop suitable interventions to alleviate need or promote opportunity" (p. xxxviii). In describing how to apply performance improvement principles as a part of developing leaders, Chevalier (2007) referred to leaders as those "who develop their employees as they assess the ability and willingness of their people, and then provide needed direction and support" (p. 3). The purpose of this study is to examine how these criteria may be applied to untrained first-line supervisors to help those supervisors become effective as performance problem-solvers.

Target Population

Organizational Context

The Light Manufacturing Company (pseudonym) is a division of a larger corporation which manufacturers a specific product for commercial sale worldwide. The Light Manufacturing Company (pseudonym) manufactures products separate from the market of the

larger corporation, specializing in a specific segment of the market. The Light Manufacturing Company (pseudonym) is administratively distinct from the larger corporation, consisting of 386 personnel. Of these personnel, twenty-five are first-line supervisors and twenty are managers.

Research Participants

The Light Manufacturing Company (pseudonym) personnel participating in this research include first-line supervisors, managers, and workers being supervised at the facility utilized for this research study. The involvement of each of these types of personnel is indicated in Table 5.

Table 5.

Table of Participants

Participant	Light Manufacturing Company (pseudonym) Title	Involvement in Action Research	Reason
First-Line Supervisor	Supervisor, Foreman	Direct	Perform the actions of problem-solving
Manager of First-Line Supervisors	Manager	Direct	Supervise overall performance of First Line Supervisors
Worker (under supervision of First-Line Supervisors)	Associates, Workers	Indirect	Source of the problem(s) that should be solved to improve performance

Developed by author

While first-line supervisors are directly involved as the focus of this research, the managers and the workers are directly affected by the actions of the supervisors in the performance of the research. However, managers were interviewed directly and workers were observed during the coaching experiences.

Research Organization Personnel

The following characterization of personnel is based upon personal communication with the Light Manufacturing Company (pseudonym) Human Resources (HR) Manager, on October 23, 2013 and personal experience of the researcher in teaching leadership and public-speaking

courses in which the personnel participated. At the Light Manufacturing Company (pseudonym), first-line supervisors are also referred to as *foremen*. Many are high school graduates, though graduation is not a requirement for employment. Most first-line supervisors have several years of experience on the job, since each first-line supervisor *works up through the ranks* from worker to supervisory status. The experience in the first-line supervisory positions range from no experience to several years of experience as a supervisor. Workers are not members of a bargaining unit.

While workers do have available written procedures for most tasks, usage varies from job to job, based upon experience in the job. Neither managers nor first-line supervisors had been taught to coach or mentor personnel. While some classroom training is available to first-line supervisors of the Light Manufacturing Company (pseudonym), most training is on-the-job training, based upon job classification and location. The Researcher taught two classes of Light Manufacturing personnel, with twelve personnel in each class, in leadership and public speaking. (The Researcher is an adjunct professor at a community college and has no financial or legal relationship with the Light Manufacturing Company.) The basic content of these classes is illustrated in Table 6 and Appendix H.

Table 6

Leadership Training Outline

Session	Content	Exercises
1	What is the Role of a Leader?	Toothpaste Problem (emphasis: problem-solving) Good/Bad Leaders
2	Leadership Principles	Leadership Values Leadership Style
3	Leadership Environment: Global Environment (Culture, Society, Technology) Organizational Environment (Vision,	Are You a Millennial? (emphasis: differing societal mores) People and Organizations

Session	Content	Exercises
	Mission, Goals, Stakeholders, Competition)	(emphasis: organization goals) Organizational Concepts (emphasis: organization structure)
4	Leadership Environment: Workplace (Resources, Tools, Job Aids) Work (Workflow, Procedures, Responsibilities, Ergonomics) Workers (Knowledge, Skills, Capacity, Motivation, Expectations)	Survival Exercise (emphasizing teamwork)
5	Personal Leadership Skills: Listening Skills Talking Skills Coaching Skills	Listening Asking Questions
6	Improving Performance Through Leadership: Gilbert (Three Leisurely Theorems, BEM) Readiness Level	Using Readiness Level
7	Basic Principles – PI/HPT Model: Performance Analysis Performance Gap Interventions – Designing, Implementing Evaluation Leadership Style	Using PI/HPT Model: Meetings Problem Tools Problem Dynamite Factory Problem
8	Public Speaking Principles	Examples: Common Mistakes
9	Public Speaking Practice	Individual Presentations

Developed by author

Research Participants – First-line supervisors

All first-line supervisors, as well as managers, participating in the leadership classes at the Light Manufacturing Company (pseudonym) facility were invited to participate by face-to-face contact with the Researcher, using the recruitment flyers. Some first-line supervisors and managers declined to participate. Sampling of first-line supervisors was by means of purposive sampling, with the understanding that this method of sampling could lead to sampling bias and that this method might not represent the entire population of first-line supervisors and managers at Light Manufacturing Company (pseudonym). Both limitations are examined in Chapters 4 and 5 of this research study.

The parameters and goals of the research, as explained in the Recruitment Flyer, were furnished by the Researcher in written form and were also explained verbally to the classes of the leadership training course. The Researcher included as participants all first-line supervisors who volunteered to participate.

Sampling

Purposive sampling was chosen as the method of sampling for this research. As described by Borg, Gall, and Gall (1993): "In this method the researcher selects a case, or cases, from which they can learn the most" and "[the researcher] selects criteria because [the researcher] believes that they will result in collection of a clique that is manageable for the purposes of data collection and that will exhibit the phenomena of interest" (p. 101) Criteria selected for the supervisor clique for this purposive sampling are: (a) each participant has been designated a first-line supervisor, (b) each supervisor is known by other supervisors, managers, and workers to hold the position, (c) the total number in the clique is at least five, (d) each supervisor performs as a supervisor on a regular basis, (e) clique members are willing to be interviewed and observed regularly, and (f) clique members who discontinue participation during the period of the three months of the research are willing to be interviewed regarding the reasons that each discontinues participation.

Each participant was trained, coached, interviewed, and observed by one researcher. Each of these processes requires time to be effective. In order to provide sufficient time for each of these processes, inclusion of more than ten supervisors would not be *manageable* by the researcher. Since a goal of the research is to establish collaborative relationships with the supervisors initially and then develop those relationships during conduct of the study in order to

facilitate coaching and action research, a working group of five is estimated as ideal. But as Brinkerhoff (2006) stated,

> …what if we could demonstrate – with convincing evidence – that a person really did learn something new, that they really did use this learning in some important job application, and that this job application led to a worthwhile outcome; would we not have a credible and defensible instance of impact from training? (p. 9).

If just one supervisor was able to improve in ability to solve performance problems, the case may be made that the intervention was worthwhile.

Attrition in the number of participants during the research may threaten validity of the research because, as described by Borg, Gall, and Gall (1993) "the subjects that drop out are usually different in important ways from the subjects who remain" (p. 303). Because action research is a learning process, the action of *dropping out* of the research would have been examined by means of interview to determine the reasons for discontinuing. This means of generating data could provide valuable information that might be used to improve the action learning cycles and contribute to the meta-learning that occurs throughout the research. As a means for standardization of the data generated, a list of questions to be asked during the interview of each drop-out was developed and illustrated in Appendix C. All of these questions, used as part of *after action review*, are intended to be open-ended in nature to elicit valuable data for use in the research and analysis of the research. However, no volunteer decided to drop out and all volunteers fully participated in the research.

While the desired goal was to obtain at least five supervisors to complete the three-month research period, even a smaller number would have provided useful data to answer the research question and inform future research. In describing the Success Case Model (SCM) for

evaluating the success of any training, Brinkerhoff (2006) stated: "Above all, the SCM is intended to help all stakeholders learn what worked, what did not, what worthwhile results have been achieved , and most importantly, what can be done to get better results from future efforts" (p. 48). Evaluation of the successes (those that complete the research project) as well as dropouts (those that do not complete the research project) both could provide useful, actionable data for this and future research.

The participation decision of each first-line supervisor and manager of the Light Manufacturing Company (pseudonym) was an informed decision, in that the entire research project was fully explained to each manager and first-line supervisor prior to volunteering to participate. The Informed Consent form was provided to each first-line supervisor prior to meeting the researcher in order to allow the supervisor adequate time to read and consider participation in the survey in a more relaxed environment.

Verbal consent from each worker was obtained by the researcher prior to any problem-solving event of a participating First-Line Supervisor. Verbal consent by the worker permitted the Researcher to be present for each counseling event and to record the event.

The researcher was present at the facility to conduct experiential training with each first-line supervisor on an individual basis. The total time necessary for each first-line supervisor to learn the principles of the performance improvement models and how the models are built into the Performance Problem Tool was six (hours) and was part of the curriculum for the leadership course taught by the Researcher. Coaching in use of the Performance Problem Tool and interpersonal relations with workers in this regard and practice in using the Tool on simulated problems took an additional one (1) to two (2) hours of work-time for each First-Line Supervisor, depending upon the needs of the First-Line Supervisor as judged by the Researcher.

The coaching was ongoing since the First-Line Supervisors faced new problems to be solved on an ongoing basis.

Research Stakeholders

Stakeholders were involved in this research effort, two participating in the performance of the research as volunteering Managers. Stringer (2014) described the importance of inclusion of stakeholders in the performance of action research: "Action research works on the assumption that all people who affect or are affected by the issue investigated should be included in the process of inquiry" (p. 6). Stakeholders for this action research are listed in Table 7.

Table 7

Table of Stakeholders

Stakeholder	Involvement	Reason for Inclusion as Stakeholder
First-Line Supervisor	Direct	Development of improved problem-solving skills, supervisory skills, and improved communication with workers
Manager of First Line Supervisors	Direct	Beneficiary of improvement in supervisory skills of First-Line Supervisors in achieving organizational goals
Upper Management of the Light Manufacturing Company (pseudonym)	Indirect	Beneficiary in increased realization of organizational goals
Public	Indirect	Consumers of the products of the Light Manufacturing Company (pseudonym)

Developed by author

Stakeholders for this research are considered to be the participating First-Line Supervisors, managers of those First-Line Supervisors, higher management, and the customers for the products of the Light Manufacturing Company (pseudonym). While the public is not directly included in the research, the public should be considered to a stakeholder, in that the

public supplies the sales revenue for operation of the Light Manufacturing Company (pseudonym). While higher management is also not directly included in the research, the goals of higher management set a portion of the goals that this research is intended to meet and two (2) Managers directly participated in the research. Both of these Managers were managers of first-line supervisors.

This research plan was implemented with consideration of the Light Manufacturing Company (pseudonym) stakeholders involved. Stakeholder support is necessary in the beginning for three major reasons: (a) to participate in implementation of the research, (b) to support First-Line Supervisors during research, and (c) to be the beneficiaries, directly or indirectly, of any improvements in performance resulting from the research. Stakeholders are also the source of much of the data collected as part of the research.

Research Design

Research Design – Initial Action Research Cycles

The initial action research cycles were developed in advance of commencement based upon established theory of action research and the perceptions of the Researcher. An action research cycle consists of four steps: constructing, planning action, taking action, and evaluating action. In order to provide a context for supervisors, individual training in performance improvement and the Performance Problem Tool were supplied by the Researcher prior to commencement of the initial action research cycles.

The initial design for the action research cycles is illustrated in Table 8.

Table 8.

Table of Action Research (AR) Processes

Project	Problem-Solving Action Research (each First-Line Supervisor)	Job Aid Action Research (cohort)
Training and Practice in Performance Improvement		
	Initial Action Research Cycle	Initial Action Research Cycle
Meta Learning	Subsequent Action Research Cycles (estimated: 2)	Subsequent Action Research Cycles (estimated: 2)
	Conclusion of Research	

Developed by author

The initial project activity was refining the research site context, gathering initial data and artifacts as well as interviewing participating Managers and First-Line Supervisors. Interview questions for Managers and First-Line Supervisors are illustrated in Appendices K and L, respectively. Training and practice in applying basic concept of performance improvement (PI) follows, preparing each First-Line Supervisor to perform the action research cycles.

Two action research processes took place concurrently, the Problem-Solving Action Research Cycles and the Job Aid Action Research Cycles, over the three-month project. While each of the Action Research processes proceeded at the same time, one was an individual cycle for each First-Line Supervisor and the other was a cohort cycle for all of the First-Line Supervisors collectively to improve the job aid. The length of the initial and subsequent Action Research cycles for each First-Line Supervisor varied in duration and frequency. Because each First-Line Supervisor was expected to develop problem-solving skills depending upon the skill level and motivation of each as well as the number of problems each participating First-Line Supervisor encountered, Action Research cycle length and depth differed. An average number of cycles for solving each performance problem by each First-Line Supervisor was expected to be three, an initial and two subsequent Action Research cycles. The Job Aid Action Research

cycles proceeded collectively, with the Researcher coordinating and synthesizing the feedback from experience of each First-Line Supervisor to develop an improved job aid for all First-Line Supervisors to use. A total of three Job Aid Action Research cycles was anticipated.

Meta learning during the Action Research cycles occurred during the entire three-month process. The conclusion of the research included a general review with First-Line Supervisors and Managers of the entire research project, with emphasis on the lessons learned and any unanswered questions that might impact problem-solving skills for the future.

Refining the Light Manufacturing Company (pseudonym) Context

While the goals of higher level management for this project have been expressed for this study, the participating and other managers were re-visited with the express intent of discovering any refinement in goals or purpose. The managers of participating First-Line Supervisors were consulted to review the purpose and goals of the initial action research cycle and to provide each manager with an initial view of the commitment to the project that were envisioned. The participating First-Line Supervisors provided relevant input with regard to goals and purpose as a part of initial relationship-building with the Researcher. Important to construction is that "…the action researcher engage relevant others in the process of constructing and not be the expert who decides apart from others" (Coghlan & Brannick, 2010, p. 9). In addition to helping construct the initial action research cycle, consultation with stakeholders provided further context to the environment of the action research cycles as well as artifacts that were collected along with data in the study.

Training in Performance Improvement

Goals. The instructional goals of experiential training of First-Line Supervisors in the form of on-the-job (OJT) training of each First-Line Supervisor participating in the research

were: (a) understanding the Performance Improvement/Human Performance Technology Model and the Updated Behavior Engineering Model, (b) understanding construction and use of the Performance Problem Tool (shown in Appendix A), (c) practice in use of the Performance Problem Tool on typical example performance problems, and (d) coaching in various skills to aid first-line supervisors in performance problem-solving. First-Line Supervisors also gained experience in analyzing performance problems, through a combination of case study examples and practice in use of the Performance Problem Tool to determine a performance gap, analyze the potential causes of the performance problem, and design one or more interventions to close the performance gap of each problem being solved.

Experiential Training Instructional Strategy. The instructional strategy consisted of a combination of:

- Explanation of the Performance Improvement/Human Performance Technology Model
- Explanation of the Updated Behavior Engineering Model
- Demonstration of how the both Models were used as a basis of the Performance Problem Tool (Appendix A)
- Demonstrations of how the Performance Problem Tool may be utilized to solve performance problems, including three different performance solutions
- Coaching of each First-Line Supervisor to discover strengths and weaknesses as performance problem-solvers
- Coaching of each First-Line Supervisor to improve weaknesses in problem-solving
- Critiquing of each First-Line Supervisor following problem-solving events observed during research

Notes were kept by the Researcher and shared with each First-Line Supervisor during the instruction and coaching and during action research, with emphasis on the reflection that occurs during the cycles. Instruction and demonstrations were presented as a part of the leadership course taught by the Researcher to twenty-four managers and supervisors of the Light Manufacturing Company (pseudonym) facility. Participating First-Line Supervisors were expected to develop their skills in solving problems over time during the research. First-Line Supervisors were coached by the Researcher to become better problem solvers, especially with the skills of the First-Line Supervisor to communicate with and lead workers. The Researcher monitored the development of supervisory skills, with emphasis on answering the research question though studying the results obtained by the First-Line Supervisors.

Development and Selection of Experiential Training Instructional Materials. Selected parts of four texts were utilized to act as a foundation in principles of performance improvement as well as generate outlines of typical problems encountered on the job and for practice in solving performance problems. The four texts were made available to First-Line Supervisors during the research and used by the Researcher in conducting the research. The four texts are:

- Chevalier, R. (2007). *A manager's guide to improving workplace performance*. New York: AMACOM.
- Kirkpatrick, D. L. (1971). *First-line supervisory training and development*. Reading, MA: Addison-Wesley Publishing
- Mager, R. F., and Pipe, P. (1997). *Analyzing performance problems, or you really oughta wanna*. Atlanta, GA: CEP Press

- Bacon, T.R., and Spear, K. I. (2003). *Adaptive coaching, the art and practice of a client-centered approach to performance improvement*. Mountain View, CA: Davies-Black

Purpose. A job aid, called the Performance Problem Tool (Figure 1 and Appendix A), based upon the Updated Behavior Engineering Model and the Performance Improvement/Human Problem-solving exercises were based upon ideas generated in each of the above texts.

Research Design – Job Aid

The job aid, based upon the Performance Improvement/Human Performance Technology Model, was used to help each participating First-Line Supervisor to determine what could be the possible reason(s) for a performance problem. The Researcher aided the First-Line Supervisors on the job to use the initial design of the Performance Problem Tool on a practice basis to build skill and an actual basis to improve ability to solve performance problems.

Job Aid Development. The Performance Problem Tool started from an initial version and evolved during the action research. The base job aid is the outline developed from the Performance Improvement/Human Performance Technology Model of Van Tiem, Moseley, and Dessinger (2012) and the Updated Behavior Engineering Model of Chevalier (2008). As stated by Sanders (2001), "The development of job aids is an act of engineering as opposed to a creative one" (p. 36). The initial Performance Problem Tool is illustrated in Appendix A.

The job aid, the Performance Problem Tool, was designed so that the First-Line Supervisor states the particular performance problem in writing, analyzes performance to obtain a performance gap, and then makes an initial estimation of a possible cause of the problem. The First-Line Supervisor makes a general assessment of the category in which the cause of the problem might lie. The choices include three environmental categories – information, resources, and incentives – and three individual categories – knowledge/skills, capacity, and motives. The

First-Line Supervisor then ranks the categories as potential bases for the problem in the order the supervisor thinks is the most likely to be the cause of the problem. The First-Line Supervisor reviews the ranking of categories and proceeds to the portion of the tool with that category title. The First-Line Supervisor will then review a set of questions relative to that category and will choose the factors in that category that seem most likely to the First-Line Supervisor to be the underlying reason for the performance problem. The First-Line Supervisor may choose the method for making these determinations, whether by questioning the individual with the performance problem, an individual who is an exemplary performer and does not exhibit the performance problem, or other personnel, as desired by the First-Line Supervisor.

Once the First-Line Supervisor has found what the Supervisor believes to be the performance gap and the basis of the performance problem, the First-Line Supervisor can then make a judgment as to the action to take to mitigate the performance problem. If the action is within the authority of the First-Line Supervisor, the Supervisor may choose to implement the action directly. If the action selected by the First-Line Supervisor as the most effective action to improve performance is not within the authority of the Supervisor, then the First-Line Supervisor will discuss the problem and recommended solution with the Supervisor's manager in order to implement the action chosen. As part of the mitigation effort, the First-Line Supervisor will review and record the result of the actions taken. Should the action have no effect or proves counter-productive, the First-Line Supervisor can stabilize the performance and re-analyze using the Performance Problem Tool, now informed by the solution that was not appropriate or applicable.

Each First-Line Supervisor entered the preparation to use the job aid with different levels of experience and knowledge. As a part of the needs assessment for each First-Line Supervisor

in the coaching phase, the different levels of competency were addressed by devoting extra time to understand and practice in using the job aid in a coaching context. Adaptive coaching was especially useful in providing help to each First-Line Supervisor in accordance with the needs of the individual.

From this initial version of the Performance Problem Tool, adjustments were made in the content and/or method of use of the Tool in order to improve the Tool or use of the Tool. Because of the advantage of actually trying to use the Tool, good communication between the Researcher and the First-Line Supervisors was essential in an evolving Tool that became more effective during the research.

Research Design - Coaching

Coaching is helping a person reach their goal. Bacon and Spear (2003) described business coaching: "…coaching in business context can generally be defined as informal dialogue whose purpose is the facilitation of new skills, possibilities, and insights in the interest of individual learning and organizational advancement" (p. xvi). Coaching in this research is intended to help supervisors get started as problem solvers, learn what their strengths and weaknesses are, and then improve in order to become adept at using the Performance Problem Tool to recognize and reduce the problems encountered. Bacon and Spear (2003) emphasized that a needs assessment be performed for each person being coached. The coaching as well as the thought process used to establish both was recorded in writing by the Researcher.

Taking Action. The third step in the initial action research cycle was implementing the plan developed. Taking action in the initial action research cycle permitted each First-Line Supervisor to discover how each could use the knowledge to adapt to the individual. This initial needs assessment was conducted with each Supervisor to develop specific context before

commencement of the problem-solving action research cycles. Needs of each supervisor were evaluated by the Researcher during progression of individual AR cycles.

In the experiential training and during research, the Researcher supported the participating First-Line Supervisors in accordance with the needs of each. For all coaching training, the primary intent was to help a participating First-Line Supervisor to become a better problem solver, with observation of the Researcher used in analyzing the progress in measurable terms.

Implementing Initial Action Research Cycle on Problem-Solving

The initial action research cycle formed the basis for this action research study, with an action research cycle consisting of constructing, planning action, taking action, and evaluating action. Each of these steps is described in detail below. Although two different types of action research cycles were occurring concurrently, one to develop problem-solving skills of First-Line Supervisors and the other to improve the Performance Problem Tool, the approach to each type was identical, despite the difference in goals of the two types of cycles and the difference in participation by the First-Line Supervisors in each type of cycle.

Constructing. Constructing an action research cycle is determining the basis of the cycle. Information gathered while establishing the research context was used to help construct the initial action research cycle. Construction was influenced by the assumptions of the Researcher, as modified by data generated during refining of the context of the research and training and coaching in performance improvement fundamentals in the first two weeks.

Planning Action. Once construction of the initial action research cycle was completed, the process of planning action proceeded, with the context and purpose as the basis. While the plan of action was envisioned as using the knowledge and practice of application of the

knowledge of performance improvement to start solving performance problems, emphasis was placed on collaboration with each First-Line Supervisor in planning the initial action of the First-Line Supervisors in the action research cycle. Each participating First-Line Supervisor was part of the planning process and guided the planning, with the Researcher helping the Supervisor to shape the plan for each before each started taking action. The Researcher collaborated with each First-Line Supervisor to define the starting point for that Supervisor as well as the individual goal of that Supervisor for that action research cycle. For a new First-Line Supervisor, this goal consisted of solving a certain number of problems or developing the skill of the Supervisor as a communicator in talking with workers to solve problems to a degree that the First-Line Supervisor established. The number of problems that each First-Line Supervisor attempted to solve varied with the individual Supervisor, making improvement in skill vary with the individual Supervisor. The duration of each performance improvement action research cycle was different for each First-Line Supervisor for each problem, depending upon the goal set by the supervisor during planning. The goal was improvement in problem-solving skill in order to generate the data necessary to evaluate the first cycle of action.

Evaluating Action. The fourth and final step in the initial action research cycle is evaluating what took place during the cycle. This evaluation was performed by means of collaboration of each of the First-Line Supervisors with the Researcher, using unstructured interviews as a means of eliciting feedback from each First-Line Supervisors.

Important to any intervention, including the intervention of this action research, is evaluating the results of action. One strategy of evaluation that has particular applicability to this research is the Full-Scope Model, which is built into the Performance Improvement/Human Performance Technology Model of Van Tiem, Moseley, and Dessinger (2012). "The concept of

full-scope evaluation was used as the basis for integrating the evaluation phase into the performance analysis, intervention selection, design, and development, and intervention implementation phases…of the HPT Model" (p. 534). The Full-Scope Model was designed to include four types of evaluation to be used during specific phases of application of the Performance Improvement/Human Performance Technology Model. The types, purposes, and timing of each type of evaluation are illustrated in Table 9.

Table 9

Full-Scope Evaluation

Type (What)	Purpose (Why)	Timing (When)
Formative	Diagnose and improve analysis, selection or design, and development inputs, processes and outputs	During Analysis, Selection, Design, Development and sometimes Implementation phases
Summative	Assess immediate effectiveness, efficiency, impact and value of intervention	During Implementation phase
Confirmative	Assess effectiveness, efficiency, impact, and value of intervention over time	Begin 3 to 12 months after implementation to evaluate sustainability
Meta Evaluation	Validate evaluation inputs, processes, and outputs	Contiguous with or after completion of other evaluation phases

From *Fundamentals of performance improvement,* (third edition) by Van Tiem, D., Moseley, J., & Dessinger, J., 2012,. San Francisco, CA: Pfeiffer. Copyright 2012 by International Society for Performance Improvement. Reprinted with permission.

Each of these types of evaluation and the manner in which they are utilized in the performance improvement action research cycles are described below. The Performance Evaluation Worksheet for Performance Improvement Cycles, for use by the individual First-Line Supervisor with the collaboration of the Researcher, is attached as Appendix F.

Formative Evaluation. Formative evaluation is based upon the design of the intervention, which is the performance improvement action cycle. In accordance with the Full-Scope Model, Van Tiem, Moseley, and Dessinger (2012) stated that:

> [F]ormative evaluation is to validate that the performance intervention package is: (1) designed to do what the designer/developer promise it will do, (2) grounded in the mission and vision of the organization, and (3) aligned with the objectives of the performance improvement cycle" (p. 547).

Because each individual performance improvement action cycle begins with construction, formative evaluation was utilized by the First-Line Supervisor collaborating with the Researcher. The formative evaluation deals with the present input (the current capacity of the First-Line Supervisor as a problem solver), the desired output (the desired capacity of the First-Line Supervisor as a problem solver), and the process required for reaching the goal (what the First-Line Supervisor is going to do to improve capacity as a problem-solver). Data generated during formative evaluation was through interviews with First-Line Supervisors by the Researcher and were collected in notes and written reflections of the Researcher.

Summative Evaluation. Summative evaluation is based upon the immediate reaction of the First-Line Supervisor during start of the action research cycle. This evaluation parallels Kirkpatrick's Level 1 (Reaction) and Level 2 (Learning) evaluation of training, but used in the AR cycles in this research. As stated by Van Tiem, Moseley, and Dessinger (2012): "Summative evaluation seeks to answer two major questions: (1) Did the performance intervention package solve, eliminate, or reduce the original performance improvement opportunity, problem, or gap? (2). Does the performance improvement package meet the needs of the organization?" (p. 553). Summative evaluation occurred during the beginning of the

action phase of the action research cycle for improvement in problem-solving ability of individual First-Line Supervisors. The reaction of the First-Line Supervisors to improving their ability to solve problems as well as the impact they felt from any improvement on managers and workers is emphasized in the evaluation. Data generated during summative evaluation was by means of interviews with and observation of the individual First-Line Supervisor by the Researcher, as well as observation of workers during problem-solving events by the Supervisor and were collected in notes and written reflections of the Researcher.

Confirmative Evaluation. Confirmative evaluation is based upon the long-term effect of the intervention, with long-term in this research being a complete action research cycle for the individual First-Line Supervisor. In general, this evaluation parallels Kirkpatrick's Level 3 (Behavior) and Level 4 (Results) and Phillips' Level 5 (ROI), though the time period of the action research will only permit limited evaluation on Levels 4 and 5. According to Van Tiem, Moseley, and Dessinger (2012): "The major purpose of confirmative evaluation is to provide continuous quality control over the life cycle of the performance improvement package. Confirmative evaluation does this by placing a value on the endurance of the performance improvement package and by helping the decision-makers establish what to do next" (p. 555). The length of the first action research cycle, the *life cycle* of the intervention, for each First-Line Supervisor was dependent upon the progress of the individual Supervisor, as determined through collaboration and agreement between the Supervisor and the Researcher. Data generated during confirmative evaluation was by means of interviews with and observation of the individual First-Line Supervisor by the Researcher, as well as observation of workers during problem-solving events by the Supervisor and was collected in notes and written reflections of the Researcher. In

addition, interviews with managers following completion of research generated data for use in overall evaluation of the research.

Meta Evaluation. Meta evaluation focuses on the quality of the other three types of evaluation. Van Tiem, Moseley, and Dessinger (2012) defined the value of meta evaluation: "Through meta evaluation, a professional evaluation or a trained performance improvement practitioner validates the formative, summative, and confirmative evaluation processes and products" (p. 561). In examining the meta learning that occurs in action research, Coghlan and Brannick (2010) stated that the meta cycle is "a reflection cycle which is an action research cycle about the action research cycle" (p. 11). One of the methods for meta evaluation suggested by Van Tiem, Moseley, and Dessinger (2012) is to review and reflect on all the other forms of evaluation and then "do it all over again". This method fits very well into the action research methodology and was utilized in this research.

Using the Performance Improvement Evaluation Worksheet

The Performance Improvement Evaluation Worksheet (Appendix F) provided a guide to evaluating the individual action research cycle for performance improvement. The worksheet was used by the Researcher, in collaboration with the participating First-Line Supervisor, to construct and plan the subsequent action research cycle. The Worksheet was constructed using the same evaluation methods described above: formative, summative, confirmative, and meta. To aid in recordkeeping, the first part of the Worksheet is selecting the type of evaluation. The next part of the Worksheet to be filled out depends upon the choice of type of evaluation by the problem-solver. The individual sections are described below:

Formative Evaluation: This section was completed before each action research cycle for problem-solving began and became a part of the construction and planning the action

research cycle. With the First-Line Supervisor collaborating, the Researcher described the current capacity of the Supervisor as a problem solver, the desired capacity (goal) of the Supervisor, and what the Supervisor needed to do to reach the goal.

Summative Evaluation: This section was completed at the beginning of and during each action research cycle. The questions evaluate how the First-Line Supervisor starts to change in capacity by the actions of that Supervisor as well as what the change was. The attitude of that First-Line Supervisor towards the change that did, or did not, occur was elicited and recorded. An estimate was made about the nature of the change and if more change might be necessary during the action research cycle. In addition, any change in attitude of managers and workers were evaluated, based upon the views of the First-Line Supervisor and as observed by the Researcher.

Confirmative Evaluation: This section was completed at the end of the action research cycle for the individual First-Line Supervisor and evaluated what change occurred in the Supervisor as a result of the action research cycle. The success, or lack of success, of the First-Line Supervisor in making changes in problem-solving skills through action were evaluated. The evaluation for each First-Line Supervisor compared the starting capacity with the ending capacity for that action research cycle. The number of problems solved, or not solved, and the reasons for both were also evaluated and recorded.

Meta Evaluation: This section was completed at the end of each action research cycle and evaluated the whole cycle for the individual First-Line Supervisor. The whole process was examined and an evaluation made of the environment, in terms of both the barriers to solving problems as well as the elements conducive to problem solving. The First-Line Supervisor was encouraged to perform self-evaluation to determine strengths as weaknesses entering the next

action research cycle. Each First-Line Supervisor evaluated the entire action research methodology to determine how the process was helping the Supervisor and what needed to be changed to help more. The First-Line Supervisor and the Researcher reflected on what attitude changes occurred in managers and workers, if any, during the action research cycle.

Concluding an Action Research Cycle. The conclusion of each problem-solving action research cycle is based on goals established during the construction step of each action research cycle. For each First-Line Supervisor in the problem-solving action research, the goal was established by agreement with the Supervisor. Because each First-Line Supervisor entered a problem-solving action research cycle with a different level of skills and experience in problem-solving, each Supervisor had a different goal than other Supervisor. That goal varied from attempting to solve a specific number of problems to achieving a level of comfort with applying the performance improvement knowledge, as determined by the Supervisor. The specific goal for each cycle for each First-Line Supervisor was developed and committed to writing based on collaboration of each Supervisor and the Researcher. It was expected that each First-Line Supervisor would progress as a problem-solver, or not progress as the case may be, on a different time schedule from each other First-Line Supervisor. For this reason, each First-Line Supervisor was expected to differ in the number of action research cycles completed from every other First-Line Supervisor.

Any data generated during the action research cycle, any artifacts found, and any discoveries about the original construction were recorded by the Researcher and were presented to each First-Line Supervisor in the effort to determine which adjustments were necessary to carry out the next cycle of action research for that Supervisor. Detachment by the Researcher

was achieved by assuming the role of a facilitator and not trying to guide the feedback of the First-Line Supervisors.

The results of the evaluation for performance improvement action research cycle was expected to provide the necessary feedback to permit constructing the next cycle for performance improvement. At the completion of three months of action research on problem-solving, each First-Line Supervisor was evaluated by the Researcher, the Supervisor themselves, and the manager of the participating First-Line Supervisor, with the intent of determining how effective each had become as a performance problem-solver. The criteria used in this evaluation was the criteria of experts in performance improvement, as detailed in the Purpose section above. Emphasis in this evaluation were not focused on the starting point or the end point of the action research, but rather the change that occurred during the action research.

Reflection. Reflection is an important part of the action research evaluation because it permits First-Line Supervisors and the Researcher to step back from the action to elicit the meaning of the results of the action. "The critical dimension to action research is how review is undertaken and managed. Review is essentially reflection on experience, and in any such reflection the critical questions are asked not to evoke guilt or blame but to generate learning as to what is taking place and what needs to be adjusted" (Coghlan & Brannick, 2010, p. 70), Explicit reflection by each First-Line Supervisor shaped the feedback necessary to begin a subsequent action research cycle.

Implementing Initial Action Research Cycle on Job Aid Improvement

Constructing the action research cycle for improvement of the Performance Problem Tool began with the initial Performance Problem Tool in Appendix A and resulted in the Revised Performance Problem Tool in Appendix I, modified as desired by the First-Line Supervisors,

suiting the perceived need of the Supervisors through usage. Each First-Line Supervisor was part of the planning process as a result of initial exposure to the Performance Problem Tool in the training, with the Researcher making changes to the initial design and then disseminating the Tool for use by each participating First-Line Supervisor before each started taking action with the Tool.

The conclusion of each job aid improvement action research cycle was based on goals established during the construction step of each action research cycle. For the initial job aid improvement action research cycle, the initial form of the Performance Problem Tool (Appendix A) was the basis for action for the cycle. The Tool was developed and reviewed by experts as being the most appropriate form of the Tool for initial use prior to this research study. As each of the First-Line Supervisors used the Performance Problem Tool, some more than others depending upon the number of times each used the Tool, the First-Line Supervisors developed opinions and attitudes about the changes necessary for the Performance Problem Tool to be improved.

At the end of the first month of use of the Performance Problem Tool, the Researcher interviewed each First-Line Supervisor to elicit the opinions and attitudes that each held regarding how to improve the Tool. The Researcher used the written results of this data to consolidate the consensus of the First-Line Supervisors, making the changes to the Performance Problem Tool, and then distributing the revised Tool to each First-Line Supervisor to use with new performance problems that each encountered. Should a First-Line Supervisor be in the midst of solving a performance problem when a new version of the Performance Problem Tool was issued, the Supervisor was expected to use the former version of the Tool to complete the problem solving process and use the new version on subsequent problems encountered. At the

end of the research period of three months, a final version of the Performance Problem Tool was prepared, based upon the data generated in the action research cycles to improve the Tool. An end analysis, based upon interviews with each participating First-Line Supervisor, was used as a basis to determine how effective the Performance Problem Tool was in aiding Supervisors solve performance problems.

Use of the Tool in problem-solving provided feedback from each First-Line Supervisor to the Researcher to provide data for evaluation. Evaluation of the content and design of the Performance Problem Tool, generated by actual use of the Tool, with the changes necessary to provide an improved Tool for use during the next action research cycle.

The same Full-Scope Evaluation Model, developed by Van Tiem, Moseley, and Dessinger (2012), and described for the individual performance problem-solving action research cycles above, was also used to evaluate the cohort action research cycles for the job aid, the Performance Problem Tool. The Full-Scope Evaluation Model is illustrated in Table 9 and consists of formative, summative, confirmative, and meta evaluation. Each of these types of evaluation and the manner in which they are utilized in the job aid action research cycles are described below. The Performance Evaluation Worksheet for Job Aid Cycles, for use by the First-Line Supervisors as a group, with the collaboration of the Researcher, is attached as Appendix G.

The First-Line Supervisors were interviewed individually by the Researcher prior to using the Performance Problem Tool, or the revised Performance Problem Tool for subsequent action research cycles. The Researcher synthesized the changes that need to be made in order to construct and plan the subsequent research cycle. The Worksheet was constructed using the same evaluation methods described above: formative, summative, confirmative, and meta. The

date was used to track the iterations of the worksheet as the action research on the Performance Problem Tool proceeded. The individual sections are described below:

Formative Evaluation: This section was completed before each action research cycle for the Performance Problem Tool began and became a part of constructing and planning the action research cycle. The Researcher suggested changes, as appropriate, to the current form of the Performance Problem Tool so that it could be more beneficial to the First-Line Supervisors as a whole to solve performance problems.

Summative Evaluation: This section was completed at the beginning of and during each action research cycle for the Performance Problem Tool. The questions evaluated how valuable the Performance Problem Tool was to the First-Line Supervisors as well as what changes need to be made immediately. Both the attitude of the First-Line Supervisors toward the Performance Problem Tool as well as the observation of the Researcher in initial use of the Performance Problem Tool were evaluated. A part of the evaluation was whether the Performance Problem Tool needed to be changed immediately, before completion of the action research cycle on the Performance Problem Tool. In addition, if any change was necessary, the date of the change and distribution to the First-Line Supervisors for use was recorded.

Confirmative Evaluation: This section was completed at the end of the action research cycle for the job aid and evaluated what change occurred in the Performance Problem Tool as a result of the action research cycle. The success, or lack of success, of the Performance Problem Tool in helping the First-Line Supervisors in problem-solving through action was evaluated. Both the opinions and reasoning of the First-Line Supervisors as well as the opinion and reasoning regarding change to the Performance Problem Tool were evaluated. The number of

problems solved, or not solved, using the Performance Problem Tool and the reasons for both were also evaluated and recorded by the Researcher.

Meta Evaluation: This section was completed at the end of each action research cycle on the Performance Problem Tool and evaluated the whole cycle for the Performance Problem Tool. The whole process was examined and an evaluation was made of the environment, in terms of both the barriers to use of the Performance Problem Tool in solving problems as well as the elements conducive to using the Performance Problem Tool. The First-Line Supervisors and the Researcher evaluated the Performance Problem Tool and use of the Performance Problem Tool to determine strengths and weaknesses entering the next action research cycle. Each First-Line Supervisor and the Researcher evaluated the entire action research methodology to determine how the process was helping in development of the Performance Problem Tool and what needed to be changed to help improvement. The First Line Supervisors and the Researcher reflected on what the advantages and disadvantages were to using the Performance Problem Tool to solve performance problems.

Research Design – Subsequent Action Research Cycles

Action research cycles subsequent to the initial action research cycle, for both performance problem-solving and Performance Problem Tool improvement followed the same basic process as the initial action research cycles. While the initial action research cycles were developed primarily from the perceptions of the Researcher, with initial shaping by the First-Line Supervisors, subsequent research was expected to be refined. A combination of the feedback from evaluation by First-Line Supervisors in each cycle, discoveries of artifacts, and other data shaped all constructing, planning, and taking action for subsequent cycles. All data generated, whether from interview or observation were recorded by the Researcher. In addition,

a copy of all instances of use of the Performance Problem Tool to solve performance problems were collected by the Researcher to aid in the decision-making process for changing the Tool. All changes and the reasons for changes, based upon data as well as the judgment and reflection of the Researcher on the data, were recorded by the Researcher.

It was further expected that reflection on each cycle by all participating First-Line Supervisors served not only to refine each succeeding action research cycle, but also permitted meta learning about the overall study.

Role of the Researcher

The role of the Researcher included:

- Planning with participating First-Line Supervisors and Managers to not only take advantage of the knowledge of the each to establish measurable goals for the change in the First-Line Supervisors as problem solvers,
- Teaching First-Line Supervisors performance improvement principles
- Teaching First-Line Supervisors the underlying foundations, organization of, and use of the Performance Problem Tool on an individual basis to analyze performance gaps and to intervene to reduce the performance gap in measurable terms,
- Observing each First-Line Supervisor in use of the Performance Problem Tool to solve workplace problems,
- Coaching each First-Line Supervisor in use of the Performance Problem Tool,
- Integrating management of the research organization in the support of First-Line Supervisors and providing feedback to management about conducting research during and after the period of research,

- Obtaining informed consent of participating First-Line Supervisors and Managers before inclusion in any way in this study,
- Conducting data collection,
- Interpreting and reporting the data, both qualitative data generated and artifacts obtained, and
- Maintaining thorough notes regarding what actions occurred, what decisions were made, the underlying feelings and attitudes of First-Line Supervisors regarding their decisions, and continual recording of the meta learning which occurred.

A single Researcher performed all of these functions.

Validity and Reliability

The goal of this action research was to produce a result that can be expanded upon and adapted to be valid and reliable for other first-line supervisors in other locations and organizations. Any person who reviews the research and the procedures used to produce this research into problem-solving by supervisors should have confidence that the action research methodology was applied in a manner to answer the research question fully and explicitly. Validity is important in design of research because valid research actually proves what the research claims to prove. For example, all questions that elicit data are asked using the same terminology used in the facility and other facilities of the organization, for clarity to the supplier of the data and for purposes of establishing validity.

Internal validity demonstration efforts include use of:

- First-Line Supervisor coaching, such as taking data, analysis and tentative interpretations back to the Supervisors or workers from which the data were derived and asking them if the results are plausible,

- observation and recording of coaching of First-Line Supervisor performance using the Performance Problem Tool (Figure 1 and Appendix A),
- peer examination by asking Dissertation Mentor to comment on the data and findings as they emerged
- participatory involvement in the research, such as involving First-Line Supervisors in all phases of the research from conceptualizing the study to writing up the findings,
- thick description of situation or phenomenon in sufficiently thick, rich detail that readers can draw their own conclusions from the data presented,
- negative case analysis by actively seeking out cases that contradict expected behavior and looking for more evidence that either confirms or disconfirms these contracting cases, permitting adjustment of expectations accordingly,
- reduction in Researcher bias by clarifying the Researcher assumptions, worldview philosophical framework, and the theoretical framework and/or orientation for the research, and
- reduction in limitations by being clear with supervisors and management regarding what the study is not intended to do.

The action research methodology for performance improvement that is refined as the result of research and coaching, is expected to be applicable to other organizations, whether each organization is part of the public sector or the private sector.

Transferability

The transferability of this research, whether to a public-sector or a private-sector organization, should be almost direct. No part of the action research methodology was developed with specific applicability to the Light Manufacturing Company (pseudonym). While

the Performance Problem Tool was developed with specific applicability to one part of one organization, the action research process on improvement of the tool should be directly applicable to any other organization, regardless of type.

Field and Pilot-Testing

Field Test

A field test was conducted to evaluate the face and content validity of the informed consent statement and the Performance Problem Tool (Figure 1 and Appendix A). The field test was conducted by means of review and the reviewers are listed in Tables 10 and 11. While all participants in the field study on face validity have extensive familiarity with the field of business, none are supervisors or managers at a different light manufacturing facility. These participants by job role are listed in Table 5. The job aid and informed consent statement were re-structured to personalize the instruments to the educational level, experience, and comprehension of expected participants in the research. All participants in the field study on content validity are experts in research as well as the Performance Improvement/Human Performance Technology Model and Updated Behavior Engineering Model.

Table 10

Table of Face Validity Field Test Participants

Evaluator	Qualification	Reason Selected	Summary of Comments
R. Chevalier	PhD, expert in Performance Improvement and the Behavior Engineering Model	Familiarity with Behavior Engineering Model and use of this Model in organizations	Standardize terminology for personnel
G. Wallace	Performance-based instructional analyst and architect, consultant	Competency in performance improvement analysis and implementation of strategies	

Developed by author

Content validity experts, who reviewed the informed consent statement, the job aid, and the Performance Problem Tool, are listed in Table 6.

Table 11

Table of Content Validity Field Test Participants

Evaluator	Qualification	Reason Selected	Summary of Comments
R. Chevalier	PhD, expert in Performance Improvement and the Behavior Engineering Model	Familiarity with the Behavior Engineering Model and use of this Model in organizations	Revise content to establish organizational context and driving and restraining forces
D. Van Tiem	PhD, expert in Human Performance Technology and Performance Improvement	Developer of the Performance Improvement/Human Performance Technology Model and expert in Performance Improvement	Revise content of Tool to include Performance Improvement/Human Performance Technology Model
S. Jones, Jr.	PhD, Associate Professor, Department of Civil, Construction, and Environmental Engineering, University of Alabama	Familiarity with personnel of transportation organizations	Revise method of asking questions to better fit the perception level of highway department personnel
S Czeropski	PhD, CPT, Valin Corporation	Competency in performance improvement	Standardize terminology for personnel, structure and standardize interviews
G. Wallace	Performance-based instructional analyst and architect, consultant	Competency in performance improvement analysis and implementation of strategies	Ensure that analysis and implementation follow proven principles of performance improvement

Developed by author

Pilot Test

No pilot testing was performed because the intent of the action research on the Performance Problem Tool was to develop an effective instrument to use for performance improvement. This study was exploratory to explain the effectiveness of the Performance Problem Tool in improving problem solving. As a qualitative study, only descriptive statistics were used, which do not need to be piloted.

Data Collection Procedures

Data in Action Research

Data, in action research, flow from and are generated from action. As Coghlan and Brannick (2010) described data: "In action research, data come through engagement with others in action research cycle" (p. 73). As Argyris, Putnam, and Smith (1985) expanded on data: "…we must elicit data on what individuals actually say and do as they interact, as well as data on what they are thinking and feeling at the time" (p. 239). For Stringer (2014), data is information gathered that "enables researcher to extend their understanding of the experience and perspective of stakeholders" (p. 101). Data for this study includes written observations, opinions and attitudes, notes from interviews, reflections of the researcher and each supervisor, and any artifacts discovered or generated during the action research cycles. In addition, interpretation and analysis of meta learning occurring during and following action research are data for this study.

Data, artifacts, and the sources of both are described in Table 12.

Table 12.

Table of Data and Artifacts

Data/Artifact	Source
Secondary Data	Extant records review, as available
Observations	Researcher, Supervisors
Opinions and Attitudes	Supervisors, Manager, Researcher (before, during, and after

Data/Artifact	Source
	research)
Interviews	Supervisors, Manager (before and after research)
Reflection	Supervisors, Researcher
Notes Generated	Supervisors, Researcher (during training, during coaching, during action cycles)
Artifacts	Copies of Tool (before, during, and at the end of research) Observations of anything that qualifies as an artifact

Artifacts: Notes from the subject supervisors filling out their Tools and notes that they create during their discussions with their workers. Also, each change in the tool was documented. Developed by author

Data Collection in Action Research

Data collection in this study flowed from the action itself and participation of the Researcher in the action, as a facilitator and neutral observer. "[D]ata generation comes from the active involvement in the day-to-day organizational processes relating to the action research process" (Coghlan and Brannick, 2010, p. 74). Collecting data is the primary purpose of the "Look" portion of the action research framework of Stringer (2014). Argyris, Putnam, and Smith (1985) recommend methods of collecting data as: "(1) observations…, (2) interviews, (3) action experiments, and (4) participant-written cases" (p. 239-240). Each of these methods was utilized in this study and described in rich, thick detail.

Observations. Observations include anything that is directly seen by the Researcher, but informed by the opinions and attitudes of the First-Line supervisors. Two challenges to recording and using observation is making sure that the description actually advances the action research (Coghlan & Brannick, 2010, p. 14) and that the observations be guided by "theories-in-use…those that can be inferred from action" (Argyris, Putnam, & Smith, 1985, p. 82). According to Stringer (2014), "Consciously observing and taking note of events places a premium on noting what is actually happening, rather than describing it from memory or from an interpretation of what people 'think' happened" (p. 93). Observations, for this study, include: (a)

what the Researcher directly observed during action in the workplace, including artifacts, and (b) what First-Line Supervisors observed while taking action, as elicited by the Researcher from the Supervisors during and after action research. Included with the description of the observations were be the source of the observation, the setting of the observation, inferences drawn from the observation by both Researcher and participating First-Line Supervisor, and the significance of the observation to the action research process for improving problem-solving skills and/or improving the Performance Problem Tool.

Interviews. Talking with participating First-Line Supervisors and Managers as well as other individuals in the workplace environment through interviews is a method not only of data collection but also data generation. "[T]alk is not simply anecdotal data but is a window onto the logic of action" (Argyris, Putnam, & Smith, 1985, p. 239). Coghlan and Brannick (2010) describes interviewing process: "Interviewing in action research tends to be open-ended and unstructured, focusing on what the interviewee has to say rather than confirming any hypothesis the action researcher might have" (p. 75). "Interviews provide opportunities for participants to describe the situation in their own terms" (p. 105). While some data and artifacts may have resulted from interview, the central focus of interviews was an understanding of the meaning and value of elicited data.

Who was interviewed? At the beginning of the study, all participating First-Line Supervisors and Managers were interviewed as to their goals and expectations for the study as well as initial attitudes and suggestions for conduct of the study. A part of the continual analysis of the interviews of Managers and First-Line Supervisors was identification of any disagreements between individuals that might help shape the construction phase of the action research cycles. As the action research progressed, individual First-Line Supervisors were

interviewed frequently for perceptions and attitude about their progress as performance problem-solvers and experience and feedback concerning changes necessary to improve the Performance Problem Tool. All participating First-Line Supervisors and Managers were also interviewed at the conclusion of the three-month study for their perceptions and conclusions regarding the research as well as the Performance Problem Tool. All interviews were conducted in the workplace.

An important consideration in interviewing was the manner in which the interviews were conducted. Each First-Line Supervisor was expected to have a different *comfort level* for being interviewed, with some Supervisors open to sharing their views and opinions and others more introspective and guarded in providing feedback. The Researcher, experienced in dealing with all types of personalities in an interview format, strove to evaluate the receptiveness that fit the *comfort level* of the interviewee. This analysis, as well as any change in analysis of the Researcher, is fully described in the description generated as part of this research. Artifacts uncovered in interviews, whether derived from the interview or observed while interviewing, were collected and described in detail in the records kept of the interviews by the Researcher.

Action Experiments.

An action experiment is an action research cycle itself and the data and artifacts generated by the supervisors. As Argyris, Putnam, and Smith (1985) describe the action experiment: "[W]e have direct access to individuals' actions and can inquire what they are thinking and feeling at the moment" (p. 241). Care was taken by the Researcher to avoid "contaminating" the description and analysis of observed actions and feelings of the participating First-Line Supervisors with inferences not in evidence. In other words, the Researcher attempted

to avoid drawing personal inferences during data collection or reflection, but rather let the data "speak for itself".

Participant-Written Cases.

Participant-written cases could be written by the First-Line Supervisors and used for clarification of generated data and to reduce the inferential bias of the researcher. However, due to the extra effort needed to develop these cases, over and above the requirements of the First-Line Supervisors detailed above, participant-written cases were not be utilized in this research.

Other Data

While a primary focus of action research in data collection is the data generated due to action in the action research cycles, other data that might inform the study may be considered secondary data. As defined by Coghlan and Brannick (2010): "Secondary data are numeric and textual data that were developed for some purpose other than helping solve the action research questions in hand" (p. 75). While the vast majority of this secondary data are not germane to performance improvement, the Researcher searched available reports, memos, procedures, and other sources of information that may have contained applicable data to inform the process of constructing, planning, and analyzing action research cycles. Both written and electronic forms of data were examined for inferences, viewpoints, and practices that may have influenced performance improvement within the research organization or outside of the organization.

Any informational sources that were examined were analyzed for applicability to this research study. Several evaluation questions were asked to determine applicability, as recommended by Coghlan and Brannick (2010):

- "Who collected the data?
- When were they collected?

- What was collected?
- Why were they collected?" (p. 75)

Answering these questions for each possible source of secondary data permitted evaluating the applicability, veracity, and worth of the data for inclusion in the study.

Record Keeping

All records and artifacts were maintained in two formats – hand-written and electronic, with identical content, except for reflection during transcribing data from hand-written form to electronic form. Merriam (2009) described the value of transcribing:

> You also need to keep track of your thoughts, musings, speculation, and hunches as you prepare your data for analysis. This kind of information might be interwoven with your raw data (as in observer comments in field notes), or it may be in separate files or memos. Rather than hiring someone, transcribing your own interviews is another means of generating insights and hunches about what is going on in your data. This information, which ideally you capture in your field notes or in the margins of your interview transcript or in a separate memo, is actually rudimentary analysis. The observations or speculations will be quite helpful to you as you move between the emerging analysis and the raw data of interviews, field notes, and documents. (p. 174)

Researcher transcription for this study not only facilitated analysis, important to constructing action research cycles, but also facilitated sorting and analysis of data following the research period.

Hand-written records included notes from interviews, recorded observations, notes from reflective discussions, notes from reflections by the Researcher, copies of completed Performance Problem Tools, and notes authored by any participant or stakeholder. Hand-written

notes were converted to electronic copy by typing to electronic files. All files were named and identified with the data coding format described below. Three sets of records were maintained: hand-written materials in files, electronic working copy, and backup copy. Backup copies were re-constituted and updated at least twice monthly.

Data Analysis during Collection

Data collection during action research includes analysis as a means to improve the quality of the collection process. Merriam (2009) observed: "Data analysis is one of the few facets, perhaps the only facet, of doing qualitative research in which there is a preferred way…[T]he much preferred way to analyze data in a qualitative study is to do it simultaneously with data collection" (p. 171). Merriam went on to describe that the qualitative researcher does not know at the outset of a study what will be discovered, how it will be discovered, or what the final outcome of the study will look like. In addition, analysis during data collection helps to reduce the volume of data collected and permits the study to be more focused. "Data that have been analyzed while being collected are both parsimonious and illuminating" (Merriam, 2009, p. 171).

But how can the data collection process include analysis to obtain these advantages? Bogdan and Biklen (2007) offered helpful suggestions for analyzing data as that data are being collected. These suggestions as well as how each is applied in this action research study are listed below:

1. "Force yourself to make decisions that narrow the study" (p. 161). Decisions will be made on the value of data to answer the research question, rather than completely describe the case (as in case study), and probe for data that illuminates the specific data more deeply.

2. "Force yourself to make decisions concerning the type of study you want to accomplish" (p. 161). When recording data, the researcher will try to focus only on the data that provide insight for the study.
3. "Develop analytic questions" (p. 161). While a general set of questions will be brought to the beginning of this study, irrelevant questions will be discarded and more relevant questions will be formulated for further use.
4. "Plan data collection sessions according to what you find in previous observations" (p. 163). The results of each data collection event, such as an interview or an observation session, will be analyzed to formulate data gathering efforts for subsequent data collection events.
5. "Write many 'observer's comments' as you go" (p. 163). Comments will be made in writing during data collection and following data collection events as a result of reflection to shape critical thinking for further data collection events.
6. "Write memos to yourself about what you are learning" (p. 165). Researcher memos will be constructed immediately after data collection events to not only shape further data collection but also to contribute to the meta learning for the entire study.
7. "Try out ideas and themes on participants" (p. 165). Personnel will be asked probing questions as to their thinking and reasoning during interviews, following observation, and during planning of action research cycles to *fill in the blanks* in knowledge of the researcher.
8. "Begin exploring the literature while you are in the field" (p. 169). While a literature review has been prepared, the researcher will periodically return to

portions of the review to help deepen knowledge of the views of experts that might help guide the study.

9. "Play with metaphors, analogies, and concepts" (p. 169). The researcher will probe any data from observation and interviews that might seem familiar in other contexts to help focus understanding of the data collected.
10. "Use visual devices" (p. 171). The researcher will attempt to determine how the data being generated fits into established models, such as the PI/HPT Model, and fundamental concepts, such as closing performance gaps.

Analysis of data while it was being collected helped shape and improve formal data analysis following the research.

Data Analysis Procedures

Data analysis, in this action research study, did not occur at the beginning and conclusion of the research but as an essential part of the research throughout. Most of the data collected was actually generated during the action research cycles and was then analyzed for use in constructing the subsequent action research cycle. A thick and rich description of all data collection, analysis, and reflection occurred during the action research.

Data Coding

Data for this research was found as well as generated. Data that were found included data from extant written sources pertaining to the research organization and artifacts uncovered as a result of the research. Data was generated during training, coaching, interviewing, observing, and reflecting on all of these processes during the research. All of this data was gathered and analyzed in a systematic manner.

Coding is not simply the organization of data, but the accompanying analysis of the data that permits the data to be connected to the research theory as well as to permit the theory to help determine the meaning and significance of the data. In referring to grounded theory, Swanson and Holton (2005) defined coding: "Coding is the process of simultaneously reducing the data by dividing it into units of analysis and identifying each conceptual unit. Once patterns in the coded data emerge, they form the basis for categorical development that is higher in level and more abstract than the concepts the category represents. The categories are then modified and organized into sets." (p. 272). This definition would require some organization and detailed effort to keep track of the iterations of data analysis.

Gough and Scott (2000), after researching how coding was pursued by many researchers, stated: "There appears to be no universally agreed view of the coding process in qualitative research." (p. 339). While many methods and opinions about methods could be found, finding consensus also was elusive. Gough and Scott found that many seemingly simple questions could not be agreed upon. For example, which should come first, coding or data collection? While each had supporters, the conclusion could be that coding and data collection should occur at the same time. That method is followed in this research with initial data collection in order to (a) establish a background of data that describes both practice and attitude of all primary stakeholders, (b) determine what types of problems are most commonly encountered in the opinions of all primary stakeholders and as found in facility records, including grievances, and (c) the change in both attitude and proficiency in problem-solving of selected first-line supervisors before, during, and at several intervals after commencement of research. The primary stakeholders themselves shaped the questions asked in all data collection instruments before and after the research. These provided some of the categories that can be used in coding,

including type of stakeholder, type of problems encountered, and when the data was developed. Coding matched the type, source, and chronology of data.

Gough and Scott (2000) also found that coding will help to identify data that is meaningful to the research and related to the research question as well as data that did neither. Thus the data shapes the coding and the coding shapes the data, with the research question always central to analysis. Even further, Gough and Scott stated that the researcher must constantly think of the coding and the analysis and the relationship between the two. Coding and analysis may tend to influence the other and should be kept separate in the mind of the researcher.

The coding for this research is considered to be the (a) collection, (b) organizing, (c) managing, (d) labeling, and (e) maintaining data generated as a result of this research. During the course of this research, some data grew in importance and some decreased in importance but that judgment was always be based upon answering of the research question. As stated by Gough and Scott, "…there are grounds to believe that it may often be useful in qualitative research to identify two broad sets of purposes for data coding. One focuses on meanings *inside* the research context, while the other is concerned with what may be meaningful to *outside* audiences." (p. 353). With a view toward the primary stakeholders (supervisors, managers of supervisors, and workers) and secondary stakeholders (organization management and the public), the data was handled in a manner that answered the research question in a manner suitable to the perspective of each stakeholder.

In addition to the other practice found in the study by Gough and Scott, two important values to coding, originally stated by Miles and Huberman (1994), were re-stated: "Quantitative analysis may provide the means to verify hypotheses derived from qualitative research (Miles &

Huberman, 1994, p. 253). Quantitative analysis of qualitative data helps to avoid bias (Miles & Huberman, 1994, pp. 253–254), and may therefore assist the demonstration of validity." (p. 348). Reducing bias and demonstrating validity are crucial to research. According to Swanson and Holton (2005), "…conversions of qualitative data into "rough" rating scales or other descriptive statistics often helps tell the story of the case more effectively than words alone" (p. 332)

Data gathering and analysis for this research utilized a two-level system, as suggested by Guetzkow (1950) and Merriam (2009). Guetzkow (1950), in examining problems in coding qualitative data, stated: "The coding of qualitative data involves two operations, that of separating the qualitative material into units, and that of establishing category-sets into which the unitized material may be classified" (p. 47). Guetzkow further stated: "The reliability of the coding depends upon the accuracy with which the unitizing and subsequent classifying are carried out" (p. 47). Merriam (2009) provided guidelines for building a framework for unitizing and categorizing. Those guidelines include: (a) Answer the research question, (b) Look for regularities in the data units, (c) Make notations on transcripts of data collection activities as a guide to categories and sub-categories, (d) Permit categories and sub-categories to change as the research progresses, (e) Avoid borrowing classification methods, (f) Categories should be exhaustive, (g) Categories should be mutually exclusive, (h) Categories should be sensitizing, and (i) Categories should be conceptually congruent.

Answer the Research Question. Answering the research question can only be accomplished by making sense of the data generated. "[M]aking sense out of data involves consolidating, reducing, and interpreting what people have said and what the researcher has seen and read – it is the process of making meaning" (Merriam, 2009, p. 176). Categorizing the data should be grounded in answering the question.

Look for Regularities in Data. Finding regularities in the data leads to identification of categories and refinement of categories. "The task is to compare one unit of information with the next in looking for recurring regularities in the data" (Merriam, 2009, p. 177). An important additional advantage of looking for regularities is that some expected data may *not* be present, or at least not regularly appearing. This may lead to removal or minimization of some expected results in favor of the data actually generated by action.

Make Notations on Transcripts. Dividing of data into units to be placed into categories and sub-categories aids in selecting the categories and sub-categories.

> The process begins with reading the first interview transcript, the first set of field notes, the first document collected in the study. As you read down through the transcript, for example, you jot down notes, comments, observations, and queries in the margins. These notations are next to bits of data that strike you as interesting, potentially relevant, or important to your study. Think of yourself as having a conversation with the data… (Merriam, 2009, p. 178).

This coding process also makes sorting of data for analysis by electronic means very useful.

Permit Categories to Change. As the research progresses, the categories and sub-categories should be allowed to change as more and more data is collected and as the analysis of that data changes. Merriam (2009) described how qualitative research changes as the research progressives, moving from inductive reasoning at the beginning to deductive reasoning at the end of the research (p. 183). As data accumulates, categorization of the data changes simply because more is known than was known at the beginning. The analysis then changes from categories *assumed* to categories *found*. Rather than try to induce what the data *will say*, the researcher can deduce what the data *does say*.

Avoid Borrowing Classification Methods. While using an existing classification methodology to select categories and sub-categories, Merriam (2009) counseled against trying to adapt another methodology to a unique research project (p. 185). As Glaser and Strauss (1967) asserted: "Merely selecting data for a category that has been established by another theory tends to hinder the generation of new categories, because the major effort is not [data] generation, but data selection. Also, emergent categories usually prove to be the most relevant and the best fitted to the data" (p. 37). For this research, categories will be drawn from the data itself.

Categories Should Be Exhaustive. "[Y] should be able to place all data that you decided were important or relevant to the study in a category or sub-category" (Merriam, 2009, p. 185).

Categories Should Be Mutually Exclusive. "A particular unit of data should fit into only one category. If exactly the same unit of data can be placed into more than one category, more conceptual work needs to be done to refine your categories" (Merriam, 2009, p. 185). This does not mean, however, that a whole sentence cannot fit into two categories. Concentration should be paid to the two data units making up the sentence.

Categories Should Be Sensitizing. The name of a category should reflect the meaning of the data assigned to that category. According to Merriam (2009): "An outsider should be able to read the categories and gain some sense of their nature" (p. 186). In that sense, *performance* would not be a desirable category, while *exemplary performance* or *poor performance* would be desirable.

Categories Should Be Conceptually Congruent. According to Merriam (2009): "This means that the same level of abstraction should characterize all categories at the same level" (p. 186). For example, rather than using *environment* and *resources* as two categories, *environment*

would be selected as one category and *resources* would be selected as a sub-category. Merriam (2009) also counseled: "Conceptual congruence is probably the most difficult criterion to apply. Investigators are usually so immersed in their data and their analysis that it is hard for them to whether or not a set of categories make sense together. One of the best strategies for checking all the criteria against your category scheme is to display your set of categories in the form of a chart or table" (p. 187). This approach was followed during the progression of this research.

Initial Coding Categories

While keeping in focus that coding was established during the action research study, the following table illustrates the preliminary categories and sub-categories for coding:

Table 13.

Initial Data Coding Categories and Sub-Categories

Category	Sub-Category
Demographics	Experience
	Age
	Gender
Organization	Supervisor
	Manager
	Worker
Performance	Exemplary Performance
	Actual Performance
	Performance Gap
Performance Problem	Operations Performance Problem
	Maintenance Performance Problem
	Administrative Performance Problem
	Performance Problems Solved
	Performance Problems Not Solved
Environmental Factors	Information
	Resources
	Incentives
Individual Factors	Knowledge/Skills
	Capacity
	Motives
Job Aid (Performance Problem Tool)	Opinion
	Problem in Using
	Change Made

Developed by author

Data Analysis

Analysis of data was performed by manual means. Merriam (2009) explained that there were three options to approach data management, with the first option being manually by the researcher. "Another option for managing your data is to use a computer software program designed for qualitative research. A third option is a mix of manual and computer management" (pp. 174-175). This first option, manually by the researcher, was chosen for managing and analyzing data in this research.

Limitations of the Research Design

Limitations of this action research design flow from the necessity of using a limited number of First-Line Supervisors during a limited period of time spent in research:

- Number of First-Line Supervisors – six initially, with a goal of finishing the research with at least five, from one division of the organization. Studying the actions of a larger number of First-Line Supervisors on an individual basis would provide more data, but far more effort to generate and collect that data, which would be beyond the scope of a doctoral dissertation.
- Time spent with each First-Line Supervisor – based upon the time available for research and the time available from the Researcher for each Supervisor. Some actions may have been missed, some thoughts lost, through lack of contact between Researcher and First-Line Supervisor at various times.
- Asking questions. When interviewing personnel, questions should elicit information about actions as well as impressions, but asked in a manner conducive to maximizing the quality as well as quantity or information. The types of questions that will maximize

information transfer such as open-ended, hypothetical, and interpretive questions were used. The types of questions that were avoided were yes-no, leading, and multiple questions, all of which permit incomplete or misleading answers.

- Note-taking. Note taking could be conducted during or immediately after interviews or action by First-Line Supervisors when performing problem-solving. Because some individuals, Supervisors, Managers, or workers, could have been negatively affected by the process of note-taking, the desires of each individual were ascertained prior to note-taking during action activities. If note-taking had to be undertaken following action, the Researcher strove to take notes immediately after to preserve the most impressions and observations of the Researcher.
- Remaining unobserved. The intent of this research is develop the skills of First-Line Supervisors as problem-solvers by their own actions following training, rather than participate in solving individual performance problems. The Researcher, as much as possible, avoided being the *third person in the room* during activities of the First-Line Supervisors, not participating in the activity. In order to minimize visibility, a standardized approach to explaining the presence of the researcher when Supervisor and worker met to discuss performance problems was developed in the beginning of the research by involving First-Line Supervisors and Managers in development. The Researcher remained a collaborative partner with First-Line Supervisors in all other aspects of coaching and action research.
- Inferential bias of Researcher. As Borg, Gall, and Gall (1993) stated about bias in action research: "Because the researchers tend to be personally involved, bias is typically present" (p. 398-399) Researcher bias in inferences of data and artifacts can skew the

action research process in a direction other than its natural course. Through use of a rigorous method of data collection, reflection, and description, the Researcher attempted to detach the pre-conceived inferences and bias at a minimum during action, but avoid impeding action.

- Hawthorne Effect – an assumed effect of positive influence on action simply by being a participant in research. Detailed research by Jones (1992) points to lack of existence of such an effect. Levitt and List (2011) examined the original data from the Hawthhorne experiment: "The data from the illumination experiments, however, were never formally analyzed and were thought to have been destroyed. Our research has uncovered these data. We find that existing descriptions of supposedly remarkable data patterns prove to be entirely fictional" (p. 224). Research by Lied and Kazandjian (1998) led to the conclusion: "The Hawthorne effect is used to describe the positive impact on behavior that sometimes occurs in a study or experiment as a result of the interest shown by the experimenter in humans who are being treated, studied, or observed. We propose that the Hawthorne effect can be viewed as an active construct to develop a coherent strategy for performance improvement." (p. 201). Regardless of whether it exists, the presence of an effect such as the *Hawthorne Effect* were reflected in the observances and interviews of the researcher.

Expected Findings

It was expected that the first-line supervisors participating in the action research would demonstrate the ability to use the Performance Problem Tool to identify and resolve worker performance problems during the course of the research. Performance improvement of workers was expected to be illustrated by means of measurement of quality in product as well as change

in attitude toward performance on the job. Performance of the participating first-line supervisor was evaluated by observation of the performance of each supervisor as a basis for coaching that supervisor and as part of the description and analysis of those observations. Both the problem-solving abilities of supervisors, and attitudes toward those abilities, and the job aid were expected to show significant change, both in tangible and intangible ways, flowing from the action research.

Ethical Issues

Research should be ethical. But what are ethics and how do they apply to research? A dictionary might define ethics as the interpretation of moral values or a code of conduct for honesty. Scholars follow ethical guidelines in attribution of sources and ideas, giving credit for original thought that the scholar appropriates for use. Federal law prescribes standards for use of subjects in research and codifies law for copyrights and copyright infringement.

For researchers, honesty is critical to acceptance. Though scrutiny may be close and wide-spread or loose and limited, the researcher should follow the same guidelines for honesty and integrity. Sources should be given credit for what the researcher uses that does not belong to that researcher and research subjects are title to protection, not just to the letter of the law, but to the spirit of the law, too. Data should be analyzed with as little bias as possible so that the data *speaks for itself*. Selective use of data and artifacts to *prove* the assumption of the researcher is unethical and should not be undertaken by the researcher. Action and reflection were performed with the least amount of influence of the Researcher as possible, with the goal of the Researcher being a facilitator of action by and for the First-Line Supervisors.

Swanson and Holton (2005) apply the notion of integrity to research, stating: "Researchers are also expected to avoid errors of commission and omission in dealing with data"

(p. 433). A researcher should seek, collect, and follow data and artifacts through the pathway provided by that data. Many anecdotal examples can be found of cases in which unethical researchers published conclusions that were unethical. In each anecdote, evidence of pressure to make conclusions not warranted or supported by the extant data can be found to lead to the erroneous conclusion.

In the Belmont Report, ethics in research were promulgated, with emphasis on integrity in working with research subjects. The National Commission for the Protection of Human Subjects (1979) described three principles that are most significant in dealing with research subjects. These three principles are described by Swanson and Holton (2005):

- "Respect for persons – individuals should be treated as autonomous agents capable of making decisions or as persons with diminished autonomy in need of special protection." (p. 430),
- "Beneficence – the researcher's obligation to protect human subjects. The maxim 'do no harm' applies (p. 431), and
- "Justice – requires that equality be operative in determining who will bear the burden of human subject research" (p. 431).

Both the spirit and intent of the ethical guidelines of the National Commission for the Protection of Human Subjects (1979) were followed in this research.

Care was taken in this research to avoid plagiarism in all possible forms. Using the ideas of others as if they were the researcher's own ideas is unethical and prohibited in research. Wherever possible, quoted sources were traced to the original source, with the only exceptions being works in a foreign language, such as those of Lewin.

Confidentiality

All First-Line Supervisors were assigned a code to use on all correspondence, as well as notes from interviews, discussions, and observations. The Researcher maintained the list of code assignments in order to permit connection of data generated over time to an individual in order to monitor how that data changes with time. The identity of the particular First-Line Supervisor was not known to any other participating First-Line Supervisor, manager or research reviewer to protect the anonymity of the First-Line Supervisor. Coding to preserve the anonymity of all personnel was utilized, with data and artifacts to be maintained for at least seven years after completion of research.

Conflict of Interest Statement

There exist no personal relationships or financial interests that may present conflicts of interest, or potential conflicts of interest, in the conduct of this research. The independence of the Researcher from the Light Manufacturing Company (pseudonym) before, during, and following the research was maintained and was stated to the research organization, the Light Manufacturing Company (pseudonym) verbally upon initial contact with the organization.

Summary

Action research was proposed as a qualitative study of improving the ability of first-line supervisors to solve performance problems. After the Light Manufacturing Company (pseudonym), the research organization, context was refined by the researcher by interview of supervisors, managers, and workers, and participating First-Line Supervisors volunteered, preparation of the First-Line Supervisors was begun. Participating First-Line Supervisors of the Light Manufacturing Company (pseudonym) were trained and coached in performance problem-solving both before the research project was begun and after commencing the research project. Each of those First-Line Supervisors then used action research to develop and improve skills in

applying principles of performance improvement to solve actual performance problems encountered in the workplace. The Performance Problem Tool, through use by the First-Line Supervisors, was improved as a result of feedback from these users to the researcher, a separate action research process.

Action research was chosen as the methodology for this study because developing skill in performance problem-solving requires both knowing the basic principles of performance improvement and applying those principles to real-life performance improvement. The action research methodology permits the action by First-Line Supervisors to be molded and improved by themselves, with the Researcher collecting the data generated by the Supervisors, sharing the data with Supervisors, and allowing the Supervisors not only to perceive their progress, but also change their actions in order to improve their progress. Because an additional goal of this research study was to develop a job aid, the Performance Problem Tool, to analyze and solve performance problems, action research permitted the First-Line Supervisors to modify the job aid based upon their experience in using the job aid in the workplace.

The product of this action research study should provide both a template for performance improvement of First-Line Supervisors as well as a performance improvement job aid that may be refined for any other organization to use.

CHAPTER 4: DATA ANALYSIS AND RESULTS

Introduction

The purpose of this research was to examine how first-line supervisors at the Light Manufacturing Company (pseudonym), who were trained in basic principles of performance improvement and coached in applying the principles, could improve performance of workers. Action research was chosen as a means to study how those first-line supervisors could implement their newly acquired knowledge and skills to solve worker performance problems. A performance problem exists when a worker *is not* doing what they *should be* doing (Mager & Pipe, 1997, p. 1). Action research methodology was also applied to improvement of the job aid, the Performance Problem Tool, for use by the first-line supervisors in the workplace in solving performance problems.

While organizations around the globe face numerous challenges to meet established mission and goals, the organization must depend upon individual performance to meet goals. Performance is not based upon behavior of an individual, but rather the accomplishment of an individual (Gilbert, 1978). The first level of management, the first-line supervisor, the person at the intersection of organizational goals and productivity of the workforce, is an under-utilized resource to improve productivity. Chevalier (2007) emphasized that focusing on performance improvement provides an opportunity for the organization, as well as the individual, to succeed. First-line supervisors may improve their own performance by knowing more about and using basic performance improvement principles. . Chevalier (2007) emphasized that focusing on performance improvement provides an opportunity for the organization, as well as the individual,

to succeed. The need for helping first-line supervisors develop the skills to deal with change affecting the productivity of the workforce is critical today.

This research addressed the following research questions that focus on the influence of knowledge of and coaching of first-line supervisors in performance improvement on workers at the Light Manufacturing Company (pseudonym):

- Do first line supervisors improve worker performance using the basic principles of performance improvement and the job aid?
- How do first-line supervisors implement training and coaching in the basic principles of performance improvement in order to solve worker performance problems?

Action research methodology was utilized not to simply observe the use made of knowledge of performance improvement by first-line supervisors but additionally to aid first-line supervisors in improving skills as communicators and performance improvers.

This study was defined as qualitative action research because it combines both qualitative aspects and action research aspects. According to Patton, "qualitative research permits understanding of people in a specific setting, their reaction to changes that they confront, and interpretation of both, it is important to focus on understanding as an objective of the research" (Patton, 1985, p. 1). Action research extends the qualitative inquiry to effect change in behavior. "Action research therefore is based on the proposition that generalized solutions, plans, or programs may not fit all contexts or groups to whom they are applied and that the purpose of inquiry is to find an appropriate solution for the particular dynamics at work in a local situation" (Stringer, p. 6). And, as further described by Stringer, "Change is an intended outcome of action research…" (p. 59). Combining both aspects permitted studying not only actions in performance improvement of individuals but also how individuals may change their approach to actions to

cause change in performance. Gilbert and Chevalier emphasized the value to the organization of focusing on performance as a means of increasing productivity (Gilbert, 1978; Chevalier, 2007).

The data collection process utilized in this research included training of all First-Line Supervisors in the principles of performance improvement, interviews of all First-Line Supervisors using open-ended questions, frequent observation of First-Line Supervisors in applying principles learned in solving performance problems, coaching in ways each First-Line Supervisor might improve skills as a problem-solver, plus specific responses and decisions of First-Line Supervisors to change as a part of the action research process. Data analysis included critical examination of the successes as well as non-successes of each First-Line Supervisor in solving specific performance problems confronted in the workplace, specifically focused on how each First-Line Supervisor changed in attempts to solve performance problems using the knowledge and experience of that First-Line Supervisor. Data analysis also included how useful the job aid was in solving problems and how the job aid could be improved to be more useful in performance problem-solving.

Chapter 4 describes the sample of participants from the supervisory population, the action research methodology utilized, data gathered, analysis of the data gathered, and a description of the action research conducted on the job aid, the Performance Problem Tool.

Description of the Sample

Research Organization

The Light Manufacturing Company (pseudonym) is a division of a corporation which manufacturers a specific type of product for commercial sale worldwide. The Light Manufacturing Company (pseudonym) manufactures products separate from the market of the larger corporation of which it is a part, specializing in a specific segment of the market. The

Light Manufacturing Company (pseudonym) is administratively distinct from the larger corporation, consisting of 386 personnel. Of these management personnel at the facility, twenty-five are first-line supervisors and twenty are managers.

The products of Light Manufacturing Company (pseudonym) are marketed to a specific retail market. These products marketed are more expensive to the consumer than similar products available to the consumer in that market. As described in the 2012 Light Manufacturing Company (pseudonym) annual report, the products are intended for the premium segment of the residential market. Marketing of products produced by Light Manufacturing Company (pseudonym) is not directly to the public but by means of non-company retailers serving the upscale consumer according to the annual report. Products are marketed on the basis of style, durability, longevity, and high-quality finishes. Quality of the products of Light Manufacturing Company (pseudonym) is ensured by a group of in-house quality inspectors and an incentive system for employees, based upon the quality of finished output, as determined by inspection.

The Light Manufacturing Company (pseudonym) facility is made up of five areas: (a) Receiving and Storage, (b) Materials Preparation, (c) Surface Finishing, (d) Product Assembly, and (e) Product Storage and Shipping. Raw materials for manufacturing are received by truck and stored in the receiving warehouse, with storage segregated by type of raw material. Raw materials are moved from Storage to the Materials Preparation area by means of forklifts, electric motor operated vehicles, with the types and quantities of raw materials moved in accordance with production plans developed by facility managers. Workers prepare raw materials for assembly into products by means of machinery designed to cut raw materials to proper size and initially finish the surface of the raw materials. In the Surface Finishing area, workers paint or stain the surfaces of raw materials for assembly into the products of Light Manufacturing

Company (pseudonym). In the Product Assembly area, workers combined the finished materials into products using conveyor belts and other assembly equipment and the package the finished products for storage and subsequent shipment. Selected finished products are inspected for quality prior to packaging.

Managers determine the types and numbers of products to be produced and generate weekly production plans, normally developed based upon consumer demand for the various products manufactured at the facility. Managers also direct the first-line supervisors in overseeing the entire process of manufacturing. Work in all parts of the facility is overseen by first-line supervisors, including production, quality inspection, maintenance, and various support services required, such as security and human resources. All personnel are located on the single site, with direct contact available to personnel with other personnel in the manufacturing process. During a normal week, each worker worked nine hours Monday through Thursday and four hours on Friday mornings.

Light Manufacturing Company (pseudonym) was negatively affected by the U.S. economic downturn beginning in 2008. According to the Light Manufacturing Company (pseudonym) annual report for 2012 slight losses in market share during the first three years of this downturn led to restructuring to position the business for growth and market share gains as our market segment does recover. Restructuring has included addition of continuous quality control personnel, training of supervisory personnel in leadership principles, and modernizing of equipment and production quality monitoring. According to the Light Manufacturing Company (pseudonym) annual report, this investment has already begun to show returns through lower material and labor costs as well as increased capacity).

Training of personnel in leadership principles was performed by the researcher for this study before the research for this study was begun on a contract basis. The researcher, an employee of a local educational institution, taught the course as a part of a continuing education program of instruction that was independent of the research conducted as a part of this study. Instruction in performance improvement principles was included as an integral part of the training presented to two groups of Light Manufacturing Company (pseudonym) management staff. The training content of both courses taught by the researcher was identical. In total, twenty-four (24) personnel, including four (4) managers and twenty (20) first-line supervisors, were trained in the two groups. Development of Light Manufacturing Company (pseudonym) management personnel to solve performance problems had not heretofore been a part of this restructuring effort of the organization. Content of the leadership training course taught by the researcher is illustrated in Appendix H. Subsequent training in the content and use of the Performance Problem Tool and coaching in applying principles of performance improvement by participants in the research was conducted individually by the researcher during the action research phases of the research study.

Sampling

Recruitment flyers were presented by the researcher to attendees of the first and second leadership training classes, consisting of a total of twenty-four (24) managers and supervisors. Two Managers and six First-Line Supervisors volunteered to participate in the research and signed informed consent forms. Table 14 contains the numbers of employees, leadership training attendees, and volunteers for participation in the research.

Table 14.

Table of Employees of Light Manufacturing Company (pseudonym)

Category	Description	Number (% of Total)
Employees	Total	386 (100%)
	Managers	20 (5.2%)
	First-Line Supervisors	25 (6.5%)
	Workers	341 (88.3%)
Leadership	Total Trainees:	24
Training	Managers	4
Attendees	First-Line Supervisors	20
(2 courses)	First Course:	12
	Managers	2
	First-Line Supervisors	10
	Second Course:	12
	Managers	2
	First-Line Supervisors	10
Research	Total Volunteers:	8 (33.3% of course attendees
Volunteers	Managers	2 (50% of manager attendees)
	First-Line Supervisors	6 (30% of first-line supervisor attendees)

Developed by author

Demographics of Participants

The two Managers participating in this study had an average age of 45, had been an employee of Light Manufacturing Company (pseudonym) for an average of 23 years, had been a Manager for an average of 19 years, and had been in the present managerial position for 7 years. Both were high school graduates and one was a college graduate. Demographics of participating Managers are illustrated in Table 15.

Table 15.

Demographics of Participating Managers at Light Manufacturing Company (pseudonym)

Demographic	Manager 1	Manager 2	Averages
Age	48	42	45
Experience (Years):			
As Employee	24	22	23
As Manager	18	20	19
In Current Position	8	6	7
Education (Years):			
High School	12	12	12
College	4	0	2
Technical School	0	1	0.5

Developed by author

The six supervisors participating in this study had an average age of 33.3, had been an employee of Light Manufacturing Company (pseudonym) for an average of 10.5 years, had been a first-line supervisor for an average of 5 years, and had been in the present managerial position for 4 years. All six First-Line Supervisors were high school graduates and two had attended college but did not graduate. Three of the participating First-Line Supervisors had attended a technical school, with one of the three receiving certification from the school. Demographics of participating First-Line Supervisors are illustrated in Table 16.

Table 16.

Demographics of Participating First-Line Supervisors at Light Manufacturing Company (pseudonym)

Demographic	S1	S2	S3	S4	S5	S6	Averages
Age	42	31	30	28	30	38	33.3
Experience (Years):							
As Employee	20	8	6	6	5	18	10.5
As First-Line Supervisor	10	3	1	2	2	12	5
In Current Position	4	3	1	2	2	12	4
Education (Years):							
High School	12	12	12	12	12	12	12
College	0	0	0	0	2	1	0.5
Technical School	1	2	0	1	0	0	0.67

Developed by author

While the two Managers had spent most of their careers (an average of 23 years) as an employee of Light Manufacturing Company (pseudonym), had been a manager most of their careers (an average of 19 years) and had been in the present position for a significant portion of their careers (an average of 7 years), neither had received training in management or supervision principles while an employee or prior to employment, except for participation in the leadership training course taught by the researcher and illustrated in Appendix H.

The six participating First-Line Supervisors had less experience and were younger than the participating Managers. Two of the six First-Line Supervisors could be considered as having had significant experience (18 and 20 years) as an employee of Light Manufacturing Company (pseudonym), while the other four First-Line Supervisors had spent between 5 years and 8 years as employees and could be considered as in-experienced First-Line Supervisors. The more experienced two First-Line Supervisors had been First-Line Supervisors for a significant portion (10 years and 12 years) of their employment, while the other less experienced First-Line Supervisors had between 1 and 3 years as First-Line Supervisors. None of the six First-Line Supervisors had received training in management or supervision principles while an employee or prior to employment, except for participation in the leadership training course taught by the researcher and illustrated in Appendix H.

Research Methodology and Analysis

Research Methodology

Action research was chosen as the methodology for this research, in part, because of its simplicity and, at the same time, power. Action research was defined by Coghlan and Brannick (2010) as "research *in* action, rather than research *about* action" (p. 4), a definition appropriate to this research study. Stringer (2014) maintained that a basic action research routine of "look, think, act", when repeated, can lead to solution of some problems encountered in a manner that is both easy to comprehend as well as to easy to apply. "Look" permits the problem-solver to gather data and to place that data within a context. "Think" permits the problem-solver to analyze and synthesize the data to provide a possible solution to the problem being investigated. "Act" is the process of devising a solution to the problem, implementing the predicated solution, and evaluating the results of the implementation of the possible solution. Repetition of the

process based upon the evaluation at each iteration permits refining the possible solution or developing an alternate solution to the problem. "Action research does not resolve all problems but provides a means for people to more clearly understand their situations and to formulate effective solutions to problems they face" (Stringer, p. 8).

Another reason that the action research methodology was deemed to be the best method of answering the research questions was because the nature of action research permits the first-line supervisor to attempt to solve specific problems with which the first-line supervisor is confronted. Coghlan and Brannick (2010) described evaluating action as examining the "outcomes of the action, both intended and unintended" (p. 10).

> Action research enacts localized, pragmatic approaches, investigating particular issues and problems in particular sites at particular moments in lives of interacting individuals and groups. Its purpose is to provide participants with new understandings of an issue they have defined as significant and the means for taking corrective action (Stringer, p. 61).

During this research study, each First-Line Supervisor began the research period by confronting a specific problem that the First-Line Supervisor needed to solve. Subsequent problems were identified and confronted, in some cases, while evaluating the results of an intervention conducted in an attempt to solve the initial problem.

The action research methodology also necessitates that the supervisory skills of a problem-solver change through usage of action research in attempting to solve problems. "…action research is necessarily based on localized studies that focus on the need to understand *how* things are happening, rather than merely on *what* is happening and to understand the ways that stakeholders…perceive, interpret, or respond to events related to the issue investigated"

(Stringer, p. 36). The First-Line Supervisors participating in this study exhibited that change in focus. As one First-Line Supervisor commented in an exit-interview at the conclusion of this research study: "I started to feel that I had a better understanding of problems I was trying to solve simply by thinking more about what I was doing and how it affected other people."

Problem-solving using action research, in addition to improving supervisory skills of the problem-solver, also leads to more involvement of the problem-solver with stakeholders affected by the problem, in a positive manner. Broad (2005) argued that a stakeholder in a system as "an individual, group, or organizational component, or organization with a share or interest – a stake – in the goals or operations of an activity, process, project, organization, or intervention in a complex system" (p. 7). "One of the tasks of action research, then, is to ensure that the ways that stakeholders describe and interpret events become the central focus of the research process. These different perspectives consequently become subjects of interaction and negotiation as people creatively explore ways of conceiving the situation that assist them in resolving a problem" (Stringer, p. 39). One interpretation of this is that, by merely actively seeking to solve a problem by a single problem-solver using action research, involves participation of other stakeholders in solving the problem and identifying other problems that require attention to solve.

Data Analysis

Analysis of data collected during action research was conducted with the intent of answering the research question for the context in which the data were collected. As Coghlan and Brannick (2010) described data: "In action research, data come through engagement with others in action research cycle" (p. 73). Patton (2002) explained: "Qualitative data consists of direct quotations from people about their experiences, opinions, feelings and knowledge obtained

through interviews; detailed descriptions of peoples activities, behaviors, actions recorded in observations; and excerpts, quotations, or entire passages extracted from various forms of documents" (p. 4). According to Stringer, "… interpretive research presents narrative accounts that reveal the way people experience the issue investigated and the context within which it is held. This section presents richly detailed, thickly described accounts that enable readers to empathetically understand the lived reality of research participants" (Stringer, p. 222). Further, accounts should fully describe events from the perspective of the participants, interpretation of the events by the participants, and specific actions taken by the participants to resolve the problems that the participant intended to solve (Stringer).

A total of twenty-three problems were identified by the participants initially and during the research. Using formative (before the problem solving event) and summative (after the problem solving event) evaluations of the interventions selected and implemented by the First-Line Supervisors after performance analysis using the Performance Problem Tool, thirteen (56.5 %) were successfully resolved and the remaining ten problems (43.5%) were being actively solved by the participating First-Line Supervisors at the conclusion of research. These data are illustrated in Table 17.

Table 17.

Problems by First-Line Supervisors During Research

Problems	Number	Percentages (%)
Identified	23	100
Equipment-Related	5	21.7
Performance-Related	18	78.3
Other	0	0
Problem Resolution:		
Resolved	13	56.5
Un-resolved	10	43.5
Action Research Cycles		
Total	32	100

Problems	Number	Percentages (%)
By First-Line Supervisors	31	96.9
By Managers	1	3.1

Developed by author

Formative and summative evaluation were used to judge success in solving the problems identified because the time period of the research was insufficient for definitive confirmative evaluation of the interventions implemented and being maintained. Confirmative evaluation involves extending formative and summative evaluation over a length of time that exceeds that of initial formative or summative evaluation. For example, the time frame for confirmative evaluation may be considered to be anywhere from three months to twelve months, depending upon the nature and complexity of the performance being evaluated (Van Tiem et al, 2012, p. 560).

Of the total of thirteen problems resolved during the research period, ten were resolved by four of the participating First-Line Supervisors, with the other two First-Line Supervisors resolving one each. During informal discussions with the two First-Line Supervisors during the research and final interviews with the two First-Line Supervisors at the end of the research, the reasons for the lower number of problems resolved by each became apparent. Both First-Line Supervisors stated that, during the research period, they were not confronted with but one problem requiring use of the problem-solving methodology that they had learned. As one of the two First-Line Supervisors stated: "I have a small group of workers with a lot of experience and no attitude problems at all. They do their job well and go home." Both Managers expressed confidence that they would use the methodology in the future, as problems arose.

Four descriptions of specific problems and the processes and events of the First-Line Supervisors in attempts to solve the specific problems by improving performance follow. Shani and Passmore (1985) described the action research process in terms of four factors: context,

quality of relationships, quality of the action, and outcomes (p. 439). The descriptions below follow those guidelines.

In each of the four problems described, as well as all other problems that First-Line Supervisors attempted to solve, evaluation of actions, analyses, and interventions were an integral part of the action research process. Three of the four forms of evaluation - formative, summative, and meta – are described for the four problems and are illustrative of the evaluations performed throughout the research. Confirmative evaluation of problem-solving performed by participants was limited for two reasons, the time frame of the research and the nature of the problem solved. Although the three-month research period was too short to perform confirmative evaluation of all aspects of problems, an attempt was made to project the short-term action and results to the longer time frame required for thorough confirmative evaluation.

Meta-evaluation involves validating the results and processes of other types of evaluation. "Meta evaluation is the process of evaluating formative, summative, and confirmative evaluation by literally zooming in on the evaluation processes, products, results, and recommendations to take a closer look at what happened and why" (Van Tiem etal, 2012), p. 562). Further, meta evaluation can be either of two types, Type I and Type II. Type I is performed during the other forms of evaluation and Type II is performed after the other forms of evaluation (Van Tiem etal). Type I meta evaluation was conducted in this research study as part of the action research process used by all First-Line Supervisors. Type II meta evaluation was conducted in this research study as part of evaluation at the end of each action research cycle performed by First-Line Supervisors as well as in the concurrent action research cycles utilized to improve the job aid, the Performance Problem Tool.

For some problems, the nature of the problem restricted the depth of confirmative evaluation possible. According to Van Tiem, Moseley, and Dessinger (2012):

> The major purpose of confirmative evaluation is to provide continuous quality control over the life cycle of the performance improvement package. Confirmative evaluation does this by placing a value on the endurance of the performance improvement package and by helping the decision-makers establish what to do next (p. 555).

As stated by Stringer (2014), evaluation "defines outcomes in ends that are acceptable to stakeholders, rather than those whose degree of success may be measured against some sort of fixed criteria" (p. 183). Of the first two problems described below, Problem 1 (Meetings) is one example in which confirmative evaluation was limited by both lack of fixed criteria that could be established as a standard for evaluation as well as the limited time frame available for confirmation. The nature of Problem 2 (Marred Surface), not only permitted confirmative evaluation, even with the short time frame of the research into problem-solving, but also permitted the numerical analysis of the results of the problem-solving effort.

Problem 1: Meetings

Problem: Meetings held by a manager of First-Line Supervisors with those supervisors were not having the desired results on performance of the supervisors

Problem Description

Manager 2 had held monthly production meetings with first-line supervisors that reported to that Manager in order to keep the first-line supervisors up-to-date on production planning and to determine problems that first-line supervisors were currently dealing with or anticipated problems that might affect production. Manager 2 observed: "Some of my new supervisors reveal things to workers that they should not have revealed and others do not tell workers what

they should know about present and future production." A total of twelve first-line supervisors reported to Manager 2.

Problem Analysis

Manager 2 decided to use the performance improvement principles learned in the leadership classes to attempt to improve the results of the production meetings. While meeting with the researcher, Manager 2 was asked to describe the purpose of the meetings and what the Manager expected to be the result of meetings. The Manager and the researcher also discussed the frequency of the production meetings, the attendees at the meetings, and the time at which the meetings were held. This information was used by Manger 2, utilizing the Performance Problem Tool, to determine the Manager's own performance gap and choose interventions the Manager could use to improve the meetings and the results of the meetings.

Intervention: The approach taken by Manager 2 included: (a) reducing the size of the group in each production meeting, meeting with three of the first-line supervisors at a time, (b) reducing the length of each meeting from one hour to twenty minutes, (c) meeting with each group of first-line supervisors weekly instead of monthly, and (d) explaining to each attending first-line supervisor what they were expected to keep confidential from workers and what was expected to be disseminated to workers in their charge.

Formative and Summative Evaluation of Intervention: After the first week of implementation of the intervention, Manager 2 stated that: "While it took a little more of my time, I got more feedback from the first-line supervisors than I ever have. I want to keep this arrangement for another week or two and see how well it works." One of the first-line supervisors in the second group commented: "Before, we didn't know what we needed to tell our people and what was not to be mentioned. Now we know and I like it." Another first-line

supervisor said, after attending one of the meetings: "I liked having fewer people at the meeting. It was much easier to talk."

Confirmative Evaluation of Intervention: Manager 2 kept the intervention in place throughout the research period, reporting that the production meetings were providing more input from the first-line supervisors than before and that communication between the Manager and the first-line supervisors was "better than ever".

The analysis of Manager 2 was based upon the perceived need of the Manager to improve communication of the Manager with first-line supervisors, but also to improve the communication of first-line supervisors with the workers being supervised. In discussion with Manager 2, the Manager expressed that solving a personal performance problem would provide the opportunity to understand how first-line supervisors could apply performance problem-solving using the techniques taught them as well as understand how the Performance Problem Tool was used in problem-solving efforts. In a discussion with the researcher on the perceived initial success of the change instituted by the Manager, Manager 2 stated: "This seems to have solved the communication problem. I want to make it even better and will keep on asking myself and them how I can make these meeting even better." Manager 2 also committed to encouraging other managers to examine how to conduct meetings to improve the effectiveness of those meetings.

Meta Evaluation of Intervention: In evaluating the apparent success of the Manager in "solving this communication problem", Manager 2 demonstrated the veracity of a statement by Stringer (2014) on participation: "To the extent that people can participate in the process of exploring the nature and context of the problems that concern them, they have the opportunity to develop immediate and deeply relevant understandings of their situation and to be involved

actively in the process of dealing with those problems" (p. 28). In the initial and on-going attempts to improve communications with subordinates, this Manager created an atmosphere that is most conducive to effective management at the facility.

Problem 2: Marred Surface

Problem Description

Panels used as part of the production of one product of the Light Manufacturing Company (pseudonym) were found to have three small indentation, each about the size of a dime, on the smooth side. (While not all finished products were found to have these indentations, about 25% of the finished products did have these indentations.) Since the smooth side would be seen by the customer for the product, these indentations made the product not acceptable for sale. While these indentations did not affect the structural integrity of the panel or the finished product, they did mar the appearance of the finished product. First-Line Supervisor 2 attempted to find a solution to this problem.

First Action Research Cycle

The first cause was assumed to be that the indentations were already on the panel as provided by the supplier. (One side of the panel, as received from the supplier, has a rough finish and the other side has a smooth finish.) After inspection of several batches of panels that had been delivered to the plant, but not yet used, First-Line Supervisor 2 found no indentations on the panels as delivered by the supplier.

Second Action Research Cycle

The second cause was assumed to be mis-handling of the panel by Light Manufacturing Company (pseudonym) personnel during production of the final product. First-Line Supervisor 2 observed the manufacturing process and found no process on the production line that could be

the cause of these indentations. No tool used by personnel was found to have caused, or would be capable of causing, these indentations.

Third Action Research Cycle

The third potential cause of indentations was the conveyor system itself, which carried the panel through the production process to become part of the finished product. In following the progress of the panel along the conveyor system, which was an integral part of the production line, First-Line Supervisor 2 found that the panel passed through two set of identical machines that used friction to propel the panel as it was being buffed. In the production line, the smooth side was buffed first to a fine finish, ready for painting and further buffing. The rough side was buffed next, primarily to remove any debris on the panel before painting. The buffing machines were identical in construction and operation.

Of particular note to First-Line Supervisor 2 was that the conveyor caused the panel to be turned slightly after the initial buffing of the smooth side. Three small pads, identical to the size of the indentations, used friction to turn the panel. First-Line Supervisor 2 concluded that these pads were causing the indentations due to the friction they were applying to turn the panel to go through the second set of buffers.

Intervention

After discussion with other first-line supervisors, managers, and employees about a solution to this problem, First-Line Supervisor 2 determined that the best course of action to remedy the problem was a simple solution: Changing the orientation of the panel as it entered the production line. An employee removed each panel from the pallet of panels received from the supplier and placed that panel at the beginning of the production line. First-Line Supervisor 2 suggested that this employee turn the panel over before placing it at the entry to the production

line. Changing this orientation changed the workflow so that the rougher side of the panel might receive indentation, but these indentations would not be visible in the finished product.

Formative and Summative Evaluation of Intervention: No more indentations were found on the finished side of any panel thereafter. The rough side of each panel was also inspected for indentations, and none were found in ensuing production. The intervention that solved this problem was a change in workflow process, requiring a change in performance of a worker as a part of the assembly process, with little or no change in the work requirements of that worker. As one of the workers affected stated: "The change for me was simple and I am glad that I could help solve a problem."

Confirmative Evaluation of Intervention: The change in workflow process determined as the result of the problem-solving effort of First-Line Supervisor 2 was effective in solving the marred surface problem and made the overall process more efficient because a problem was eliminated, resulting in the elimination of a frequent quality discrepancy. The impact was viewed as permanent because the quality improvement applied to all future production of the specific product having a marred surface as long as the change in the workflow process remained permanent.

First-Line Supervisor 2 and the researcher used principles of return-on-investment (ROI) to establish both tangible (visible) and intangible (not visible) benefits flowing to the Light Manufacturing Company (pseudonym) from this change in the workflow process. The result was calculated as 108 US Dollar per unit of product produced and 399,600 US Dollar per year, based upon the previous year production of 3700 units.

Meta Evaluation: First-Line Supervisor 2 analyzed the problem by beginning with a list, based on personal experience, of all potential causes of the marred surface problem. By

applying the action research principles of "look, think, act", First-Line Supervisor 2 was able to eliminate all potential reasons for the problem except for the actual cause of the problem. Although the worker had not knowingly caused the problem, the change in the workflow process for a single worker in the production process improved productivity of the worker by eliminating the problem.

Problem 3: Inadequate Performance

Problem: One group of workers was not finishing work assignments in the allotted time

Problem Context

Three crews of four workers each were assigned to maintain cleanliness and aid in the setup of the overall production process in accordance with the production schedule for each week. Each crew worked in a designated portion of the facility for four hours each work-day, Monday through Friday. During the rest of each work-day, each member of the crew was assigned to work in production in some other part of the plant. Crew 1 was assigned to the Receiving/Raw Material Storage Area and the Materials Preparation Area of the facility. Crew 2 was assigned the other three production areas of the facility: Surface Finishing, Product Assembly, and Product Storage/Shipping. Crew 3 was assigned to the outside facility areas, including the employee parking lot, security fence, and all other areas not directly used for production. During the other four hours of the work-day on Monday through Thursday, each member of each crew was assigned to act as supplemental workers, as needed, throughout the facility

Each of these crews was made up primarily of new employees and was deemed by facility managers as being a part of the four-week probationary period for new employees. Each crew also was directed by a lead worker, who was not a new employee, but reported to a first-

line supervisor. The lead worker for a crew is charged with reporting the activities of the crew of worker to which the lead worker was assigned. First-Line Supervisor 6 was responsible for all three crews, assigning work responsibilities for each crew each work-day and receiving reports from each of the lead workers on Friday, the last day of a normal work-week.

Problem Description

Crew 1 was unable to complete tasks during the work-week four times in the previous twelve work-weeks. Crews 2 and 3 had finished assigned tasks acceptably in the allotted time, with no exceptions, during the same twelve weeks. On Fridays in which Crew 1 did not complete assignments satisfactorily, four hours of overtime had to be authorized for each crew members to successfully complete assigned task.

First Action Research Cycle

When First-Line Supervisor 6 asked Crew 1 lead worker the first time why the work was not completed, Crew 1 Lead Worker had explained that the number of workers assigned were not sufficient to complete the tasks assigned, though the total work assignments to each crew had been deemed by management to be equal. First-Line Supervisor 6 accepted the answer given by the Crew 1 Lead Worker and assigned one member of each of the other two crews to assist Crew 1 on Friday morning.

For the next two weeks, each of the three crews completed assigned tasks satisfactorily, with no overtime required for any crew. On the third week, however, the Crew 1 Lead Worker requested two hours of overtime for each worker in that crew to complete the work assignments for the week.

Second Action Research Cycle

First-Line Supervisor 6 used the Performance Problem Tool to again analyze the performance of the Crew 1 Lead Worker and determined that a performance gap still existed with the Lead Worker. As before, when asked why Crew 1 was unable to complete assigned tasks for the previous week, the Lead Worker stated: "I do not have enough workers to do the job right". After discussion with the researcher on this problem, First-Line Supervisor 6 decided to periodically observe performance of Crew 1 Lead Worker during that week. At the suggestion of the researcher, First-Line Supervisor 6 decided to also observe performance of the foremen of the other two crews.

After observation of the foremen over the next week, First-Line Supervisor 6 concluded that the Crew 1 Lead Worker of Crew 1 was spending several hours during the week "showing the crew members how to perform tasks repeatedly". First-Line Supervisor 6 determined that the Lead Worker was not making sure that tasks were done, but instead doing the tasks for the worker while the worker watched. First-Line Supervisor 6 also observed that the foremen of the other two crews, who were successfully completing assigned tasks in the timeframe of the work-week, spent only a few hours demonstrating proper performance and rarely performing assigned tasks themselves.

Third Action Research Cycle

After another performance analysis of the Crew 1 Lead Worker of Crew 1, First-Line Supervisor 6 asked the Crew 1 Lead Worker again how, even with more personnel assigned to Crew 1, overtime had been required. The response of the Lead Worker was: "With these people, if you want a job done right, you have to do it yourself". First-Line Supervisor 6 explained to the Lead Worker that "Your job is to make sure that the assignments were

completed properly and not to do them yourself. Except for new people in your crew, I want you to make sure that all of your people are doing their job, not do it for them".

First-Line Supervisor 6 followed up by periodically observing the performance of the Crew 1 Lead Worker of Crew 1 over the next three weeks. While the Lead Worker allowed the workers in Crew 1 to perform tasks with very little assistance over the first week, by the second and third weeks, the Crew 1 Lead Worker was again performing a number of the tasks assigned to the crew. During the two weeks, First-line supervisor 6 again reminded the Crew 1 Lead Worker that the Lead Worker should not be performing the tasks while the workers watched.

Fourth Action Research Cycle

First-Line Supervisor 6 again analyzed the performance of the Crew 1 Lead Worker and determined that while the Lead Worker had the capacity to direct the activities of Crew 1, the Lead Worker "did not have the willingness to lead the crew." In a conference with the Crew 1 Lead Worker, First-Line Supervisor 6 asked the Lead Worker why the workers needed constant demonstration of how do perform assigned tasks and the Lead Worker repeated that the workers had to be continually shown how to do tasks properly or the tasks would not be performed properly.

At the conclusion of the conference, First-Line Supervisor 6 asked Crew 1 Lead Worker: "Would you be happier working in some other part of the plant?" After several minutes, the Lead Worker answered: "Yes". First-Line Supervisor 6 obtained permission from the Production Manager and the Director of Human Resources to transfer the Crew 1 Lead Worker of Crew 1 to another job in the facility and, after discussion with one member of Crew 1, assigned that worker to be lead worker of that crew. First-Line Supervisor 6 also changed back

the allocation of personnel to the original allocation, with four workers in each of the three crews.

Formative and Summative Evaluation of Interventions: First-Line Supervisor 6 attempted to provide the Crew 1 Lead Worker the necessary assistance to enable the Lead Worker to improve performance of Crew 1. After numerous attempts over several action research cycles, First-Line Supervisor 6 determined that changing the person who filled the role of Crew 1 Lead Worker was necessary because, while that person had the capacity to be a lead worker, lacked the willingness to fulfill that role. First-Line Supervisor 6 commented: "I tried to get him to do his job, like the other lead workers do, but could not get him to change. He didn't give me any choice. I have to get the work done without any overtime." Following the changes, the performance of Crew 1 improved to the point that the crew did not require any more overtime to complete assigned tasks properly.

Confirmative Evaluation of Interventions: Over the action research cycles of attempting to solve the problem of inadequate performance of the Crew 1 Lead Worker, First-Line Supervisor 6 attempted to guide the Crew 1 Lead Worker toward more effective performance, beginning with counseling and ending with replacement of the individual. While the performance analysis of First-Line Supervisor 6 with the Crew 1 Lead Worker was well-founded, in the opinion of the researcher, the succession of interventions required to solve the problem, progressing from counseling to removal from the position, resulted from the lack of willingness or the inability of Crew 1 Lead Worker to make the attitudinal changes necessary to perform the role of lead worker in a positive and efficient manner. While the final intervention of replacing the Crew 1 Lead Worker appeared to be an effective solution initially, confirmation of the effectiveness of the solution requires more time than available in the research.

First-Line Supervisor 3 and the researcher analyzed the cost of inadequate performance of the Crew 1 Lead Worker. A total of 36 hours of overtime by workers in Crew 1 had been required and an additional 8 hours of overtime had been required from the Crew 1 Lead Worker during the time of the tenure of the Lead Worker. This overtime cost to Light Manufacturing Company (pseudonym) was about $696.

Meta Evaluation of Interventions: First-Line Supervisor 6, after observing the actions of Crew 1 Lead Worker over a period of weeks and comparing those actions to the other two lead workers, who were performing duties to successfully meet the same deadlines as other foremen, performed a correct analysis, in the opinion of the researcher, leading to cause of the performance gap of the Crew 1 Lead Worker. Several levels of intervention were required from First-Line Supervisor 6 until the performance gap was closed. While First-Line Supervisor 6 did not openly compare the performance of Crews 2 and 3 to the performance of Crew 1 in any discussion with the Crew 1 Lead Worker, First-Line Supervisor 6 did have two available standards of performance to compare to the performance of Crew 1. When First-Line Supervisor 6 concluded that the performance of the Crew 1 Lead Worker could not be raised to the standard created by the other two crews, replacement then became the only choice.

While attempting to solve this problem, First-Line Supervisor 6 recognized that communication was one issue of importance in any intervention that was selected in each round of action research. First-Line Supervisor 6 attempted to adopt the communication principles described by Stringer (2014): "When people feel acknowledged, accepted, and treated with respect, their feelings of worth are enhanced, and the possibility that they will contribute actively to the work of the group is maximized" (p. 28). When First-Line Supervisor 6 had exhausted all the efforts to communicate with the lead worker and found they were inadequate, the possibility

of active contribution to the work at the facility did not exist. In the opinion of both First-Line Supervisor 6 and the researcher, the only possible intervention that would succeed, replacement of the Crew 1 Lead Worker, was the action recommended by the First-Line Supervisor.

The Inadequate Performance Problem was one problem that involved performance as well as behavior. While Gilbert (1978) explained that "we have no need to measure behavior until we have measured accomplishment" (p. 23), analysis of this problem led to the observation that, in this case, behavior and accomplishment were inextricably mixed. First-Line Supervisor 6 recognized that the only solution to the problem was to change the behavior of the Crew 1 Lead Worker by changing the person acting as the foreman, leading to acceptable accomplishment of the crew.

Problem 4: Preventive Maintenance

Problem: Poor preventive maintenance was causing more frequent corrective maintenance

Problem Context

Many machines, large and small, are a part of the Light Manufacturing Company (pseudonym) facility, including forklifts used in the Receiving/Storage area and the Product Storage/Shipping area, both planing machines and sanding machines as well as sprayers in the Materials Preparation and Surface Finishing areas, and conveyors in the Product Assembly area. Corrective maintenance on these machines was required to the ensure operability and prevent failure or to make the machines perform properly even if failure did not occur. Failure or improper operation of any machine interfered with the preparation or assembly process, or both, and could result in failure to reach production goals. In extreme cases, machine failure or improper operation could be a safety hazard for workers.

Preventive maintenance is action that helps identify and correct potential causes of failures or improper operation that could lead to equipment failure or improper operation that could endanger personnel or inhibit production of finished products. Most of the preventive maintenance procedures were recommended by the manufacturer of the equipment, including visual inspections and checks that workers performed during a normal work-day using the machines.

Problem Description

Extant preventive maintenance procedures were written for workers at the time of installation or receipt of each machine in the facility. Each worker was trained to perform preventive maintenance on the machines utilized in the area of the production facility as well as maintenance technicians working at the facility, as a part of on-the-job training during the probationary period of employment. However, not all preventive maintenance procedures were being performed on the machines in the Product Assembly area, the area in which First-Line Supervisor 1 was one of the first-line supervisors.

Problem Analysis

After a two-hour work delay to repair one conveyor, First-Line Supervisor 1 started to investigate the cause of the problem, not knowing if the problem was the equipment or personnel operating or maintaining the equipment. At the time that First-Line Supervisor 1 started analyzing what could be done to reduce the incidences of corrective maintenance that had been required, the cause of the high incidence was not known. The initial two assumptions that were made by the First-Line Supervisor were that the conveyors being used did not meet the standard of the warranty or that environmental factors may have been the cause. After reviewing six months of maintenance records, First-Line Supervisor 1 discovered that, of the twelve conveyors

in the Product Assembly Area, the monthly average was that 3.2 of the twelve conveyors had required corrective maintenance.

Selecting the three most recent maintenance reports on conveyors in the Product Assembly area of the facility, First-Line Supervisor 1 talked with each of the maintenance technicians about the recent conveyor failures. The first maintenance technician offered the opinion that: "If the workers would do their visual inspections, I think that they can see the problems before they occur. For example, if an idler roller is out of alignment, the worker can call me in time for an easy fix before it fails." First-Line Supervisor 1 obtained similar remarks from another maintenance technician.

After talking with five workers in the Product Assembly area, First-Line Supervisor 1 discovered that only two of them were performing preventive maintenance in accordance with the manner in which they had been taught on joining the workforce in the Product Assembly area. The First-Line Supervisor decided to intervene to increase the amount of preventive maintenance being performed by devising a means by which preventive maintenance could be accomplished by all workers in the Product Assembly area.

Intervention

First-Line Supervisor 1 lettered 3-inch by 5-inch paper cards, with the number of the maintenance procedure, the frequency required of performance of the procedure and the designation of the conveyor on which the preventive maintenance would be performed. (For example, the preventive maintenance procedure for daily visual inspection of the rollers on a conveyor was number A-2. Thus, for Conveyor 3, the card read: "A-2, Conv. 3, Daily") The First-Line Supervisor obtained a wall-mounted plastic board with three slots to hold the paper cards, marking the slots as "Daily", "Weekly", "Monthly", and "Completed".

At the monthly meeting of the workers in the Product Assembly area, the manager of First-Line Supervisor 1 allowed a presentation on purpose and use of the Preventive Maintenance Tracking System that the First-Line Supervisor had devised. First-Line Supervisor 1 explained that the daily, weekly, and monthly cards for preventive maintenance had different colors. As each preventive maintenance procedure was completed on each conveyor, the paper card for that procedure and conveyor was to be placed in the completed slot in the plastic display. The process was designed by First-Line Supervisor 1 in a manner that would be easy to use by the workers and easy to be checked as completed by the First-Line Supervisor

Formative and Summative Evaluation of Intervention: At the end of the first day of use of the preventive maintenance tracking program devised by First-Line Supervisor 1, all daily inspection preventive maintenance procedures were completed for each conveyor. On subsequent days and for four consecutive weeks, all preventive maintenance on the conveyors was completed. At the end of the first month of use of the maintenance tracking system, First-Line Supervisor 1 could only identify a minor problem on one conveyor that required corrective maintenance and determined that the corrective maintenance could not have been avoided due to preventive maintenance. One worker commented: "I didn't know doing these procedures could be that useful until the First-Line Supervisor told me." When asked about the extra time required to do preventive maintenance, another worker replied: "I do most of this stuff anyway when I start the shift. Now I can easily tell my boss that I am doing my job."

Confirmative Evaluation of Intervention: While the time frame of the preventive maintenance intervention is too short for a full confirmative evaluation, the value to the stakeholders was partially established by the actions of a manager. After the first month of use of the preventive maintenance accounting and reporting system, First-Line Supervisor 1 was

asked by a manager to develop a similar system throughout the facility. At the time of completion of this research, First-Line Supervisor 1 was taken off shift-work and working with quality control personnel to install other preventive maintenance tracking boards of the same type throughout the facility. While several work-hours were required of the single First-Line Supervisor, First-Line Supervisor 1, the labor-saving and efficiency of the overall plant increased and should continue to increase with wider adoption of the intervention throughout the facility, involving more workers and more equipment.

Meta Evaluation of Intervention: The efficacy of the solution of the preventative maintenance problem was demonstrated by the immediate acceptance of the system by all affected workers and the reduction in the corrective maintenance, attributed to more thorough preventive maintenance. The solution of this problem by First-Line Supervisor 1 was viewed as a success story throughout the facility to the extent that the system developed was being used as a model for all of the facility.

Job Aid Action Research

Action research on the job aid, the Performance Problem Tool, was conducted concurrently with the action research performed by the participants in solving problems. The Revised Performance Problem Tool is illustrated in Appendix I and resulted from the comments of the participants in consultation with the researcher, and based upon action research principles. The first revision of the Performance Problem Tool was made one month after research was begun, with further revision at the end of the research period. All revisions made were based upon (a) ease of use and (b) value to stakeholders, as described below. During the first action research cycle, the first month of the three-month research period, revisions to the Performance Problem Tool consisted primarily of changes found by the First-Line Supervisors and the

Researcher regarding ease of use. The second action research cycle spanned the two-month period of the research after the first month, most revisions during this action research cycle based upon value to stakeholders.

Changes to the Performance Problem Tool were made by the Researcher in collaboration with the participating First-Line Supervisors. Managers had no part in action research to improve the Performance Problem Tool. The reasons these changes were made, as a result of conferences between participating First-Line Supervisors and the Researcher regarding usage of the Performance Problem Tool during problem-solving, are described below.

Ease of Use

All of the participating First-Line Supervisors expressed to the researcher a dislike of filling out forms and the need to make the Performance Problem Tool useful, but not require as much effort to fill out for use. One First-Line Supervisor stated: "Having to do a lot of paperwork gets in the way of me doing my job." For this expressed reason, a number of changes were made to simplify the Performance Problem Tool to maintain utility in solving problems, but not require excessive effort initially and in follow-up use after initial use.

While adding several lines to the Performance Problem Tool, specifically lines three through six of the revised Tool, might appear to be adding extra work for the First-Line Supervisors, all First-Line Supervisors agreed that adding these lines actually helped them analyze and solve the problem with which they were confronted and aided the analysis of the problem, leading them to potential solutions to the problems. By adding lines requiring initial assumption of the cause of the problem ("Equipment", "Personnel", or "Other") the problem-solver could more easily develop a course of action to solve the problems. Supervisor 2, who solved the Marred Surface Problem described above, observed: "You have to assume a cause of

the problem to begin solving it and I don't know at first if it's a people problem or an equipment problem. My first analysis of that marred surface problem was that we got the panels that way." Use of the Performance Problem Tool, with the changes added, were commented upon favorably by the First-Line Supervisors.

Another reason for this change made to the Performance Problem Tool was based upon the stated value of making the form useful for all types of problems encountered by the First-Line Supervisor. As stated by one First-Line Supervisor: "When I find I have a problem that I need to solve, I don't know in the beginning where it a problem with my equipment or my people." In discussion, all of the other five participating First-Line Supervisors concurred and changes were made to facilitate use of the Performance Problem Tool to analyze and develop one or more interventions that might solve a problem, regardless of the nature of the problem. As one First-Line Supervisor observed regarding the revised Performance Problem Tool: "Now I want to use the form to help me solve a problem and don't feel I have to fill out a lot of paperwork over and over."

An unexpected benefit of making these changes was discovered after the initial revision of the Performance Problem Tool and that benefit can best be described as *problem tracking*. The First-Line Supervisor who suggested the changes began keeping files of problems by type during the last two months of the research period. Keeping these files of initial and subsequent actions to solve a problem in the action research cycles created a history of the problem-solving effort for use to inform other facility personnel, for all stakeholders, of the problem and solution efforts. In the words of one First-Line Supervisor: "I can keep myself up to date, my boss up to date, and anyone else who wants to know what is going on in solving the problem up to date."

Value to Stakeholders

All of the participating First-Line Supervisors in this research agreed with the principle that value to stakeholders of solutions and impact of those solutions are central to problem-solving efforts. Keeping files of problem-solving efforts by means of successive use of the Performance Problem Tool not only resulted in a history of the problem-solving effort but also a means of measuring the worth of the effort by detailing the values, both tangible and intangible, to the stakeholder. The use of the revised Performance Problem Tool not only provided a guide to choosing the best intervention to solve a problem, whether the problem was an equipment problem or a personnel problem or a combination of both, but also provided additions to lessons learned as well as good practices.

Summary of Findings

Analysis of the data collected during the action research led to the following findings with respect to participating First-Line Supervisors: (a) training in performance improvement principles, (b) commitment to applying the principles learned to solve performance problems, (c) the effect of previous supervisory experience, (d) the effect of organizational culture, (e) management support to solving performance problems, and (f) the reaction of workers to solving performance problems.

Training

Attendance at the leadership training, presented to two groups of twelve first-line supervisors and managers from the facility, was voluntary and held after the normal work-day on Wednesdays at a conference room at the facility. Except in the case of sickness or inclement weather, all attendees were present at each of the nine one-and-a-half hour training sessions in the leadership training course. Only one of the twenty-four trainees exhibited open disdain for the course, though the one first-line supervisor did participate in all exercises in the course but

did not volunteer to participate in the research. Two first-line supervisors, one who volunteered to participate and one who did not volunteer to participate, stated on course evaluation sheets that: "This needs to be taught to every person before they become a first-line supervisor, though I am glad that I did come to the course."

Broad and Newstrom (1992) defined transfer of training: "Transfer of training is the effective and continuing application, by trainees to their jobs, of the knowledge and skills gained in training – both on and off the job" (p. 6). The explicit goal of transfer of training was, by design, built into the training.

During initial interviews with First-Line Supervisors and Managers who, following the leadership training, volunteered to participate in the research study, one First-Line Supervisor remarked: "This is easy to understand and I think it will be easier for me to solve problems using this." All participating First-Line Supervisors and Managers also had a positive reaction to the training, though all of the training was conducted after normal work hours and at no additional pay, with one comment being typical of the reaction of all participants in the training: "I wish I had been taught this before I became a supervisor, but I am also glad I am getting it now."

All of the First-Line Supervisors who volunteered to participate in this research study had been trained in root cause analysis, determining the cause of equipment failures through rigorous analysis. The performance improvement training, presented to all participants during the leadership course prior to commencement of the research and emphasized through coaching of individual participants, stressed the importance of complete analysis of problems, but analysis that begins with simplifying the approach and considering simple interventions. As Stringer (2014) stated: "The form of analysis should be appropriate to the problem at hand. Complex or

highly abstract theory, when applied to small, localized issues, are likely to drain people's energy and inhibit action" (p. 137). Participants in this research followed this paradigm during the research.

Manager 2, in solving the Meetings Problem described above, used the simplistic approach of self-analysis and the most obvious conclusion that supervisors were not told what was expected of them. By changing the manner in which meetings were held as well as other changes to how meetings were conducted exhibited an understanding of this principle. First-Line Supervisor 2 also demonstrated acceptance of this concept by initially assuming that the supplier was causing the Marred Surface Problem by sending defective raw materials to the facility. While this assumption was not the actual cause of the problem, as First-Line Supervisor 2 commented: "It was an obvious starting point to figuring out how to solve the problem." First-Line Supervisor 2 was also the first First-Line Supervisor to suggest changing the Performance Problem Tool so that it could be used for helping solve problems of all shorts, whatever the kind of problem.

In initial interviews with all participants in the research, each First-Line Supervisor expressed the desire to try to use the principles of performance improvement that they had learned in the leadership course. One First-Line Supervisor stated: "When I became a supervisor, I fell back on what I had learned in the military and was called down for it by my manager. One of the reasons that I volunteered is so that I can improve my communications skills." Each Manager in initial interviews committed to helping any First-Line Supervisor solve performance problems in any way that they could and to avoid being a barrier to change with respect to interventions that helped improve worker performance. As described in the Meetings Problem above, Manager 2 attempted to solve a performance problem by self-analysis and

changing the conductance of regular meetings that Manager 2 was having with First-Line Supervisors. During exit interviews with both Managers, each expressed a desire to continue helping First-Line Supervisors solve problems.

Commitment of Participants to Problem-Solving

The researcher observed the participants fulfilling their commitment to use knowledge gained from training in performance improvement principles and coaching by the researcher in applying those principles during the research, as typified by the following instances:

- Manager 2 and self-evaluation described in the Meetings Problem described above
- First-Line Supervisor 2 solving the Marred Surface Problem with very little coaching, leading to a suggestion that improved the Performance Problem Tool
- First-Line Supervisor 6 attempting to solve the inadequate Performance Problem and final analysis that the only intervention possible to change the performance of the foreman was removal of the foreman from the position and replacement with an individual who was capable of properly leading the crew in a way that would improve performance
- First-Line Supervisor 1 investing effort of personal time to develop the job aid that would aid workers to perform preventive maintenance in a timelier manner, as described in the Preventive Maintenance Problem above.

While all participants committed to attempt to apply what they had learned, four of the six First-Line Supervisors solved more problems during the research, an average of 2.5 each, each of the other two First-Line Supervisors did solve one problem. The researcher was unable to determine if the two First-Line Supervisors who solved fewer problems were less committed than the other

four First-Line Supervisors or that the two First-Line Supervisors had fewer problems confronting them during the research.

Effect of Previous Supervisory Experience

The amount of experience of participating First-Line Supervisors in years of employment or years in the position of First-Line Supervisor with the Light Manufacturing Company (pseudonym) had very little discernible effect on use of knowledge of performance improvement principles or capability of applying such knowledge to the solution of performance problems during the research period. The two effects that were notable had to do with the same participant, First-Line Supervisor 6. Supervisor 6, acknowledged previous difficulty with communication with subordinates and was able to significantly change the manner of and results flowing from better communication skills. Following training and coaching in both asking questions of and listening to subordinates as well as practicing these skills in solving performance problems, First-Line Supervisor 6 stated: "I feel as if I am asking fewer questions, but getting a lot more information than I did before."

Effect of Company Culture on Research Participants

The Light Manufacturing Company (pseudonym) mission and goals were exhibited in numerous signs and posters throughout the facility, easily accessible to all employees. One poster observed by the researcher described the "pride of knowing that we produce a product in a part of the country whose people are recognized for their craftsmanship". Three of the six participating First-Line Supervisors pointed the poster out to the researcher during the pre-research leadership training and remarked that "we all agree with that." Every participating Manager and First-Line Supervisors stated in one form or another that employees want to do a good job at the facility.

Management Support to First-Line Supervisors in Applying Performance Improvement Principles

Though the identities of participating First-Line Supervisors was kept from managers by the researcher during the course of the research, managers observed that some First-Line Supervisors appeared to them to be solving problems. As Manager 1 stated: "They're the ones who come to me with solutions to problems and not just problems." According to Broad (2005) "Organizations need help in improving the outcomes and results that follow performance improvement interventions. Measures of performance following many training and other interventions have shown very low levels of payoff…Yet there is substantial research and best practice experience that shows how to raise performance outcomes significantly. This can happen when organizations are viewed as complex systems with important stakeholders who can make or break the desired outcomes" (p. 1). Martin (2010) examined a training program for over 200 first-line supervisors at a large manufacturing organization in the Midwestern United States. This research found that:

> (1) Trainees in a more favorable workplace environment showed greater combined performance improvement than those in an unfavorable climate" and (2) "The results of this study suggest that follow-up programs should be designed to address both the immediate and general organizational environments. Care must be taken to help ensure that peers and immediate first-line supervisors help trainees put the skills to work (p. 96)

In initial and subsequent interviews with the two participating Managers, each acknowledged an understanding of the need to support First-Line Supervisors in performing their duties, problem-solving included, and the need to support First-Line Supervisors, where participating in the research or not, in solving problems. First-Line Supervisor 1 and First-Line Supervisor 5

independently informed the researcher that their managers had encouraged them to solve problems.

Reaction of Workers to Participating First-Line Supervisors

During the research period, interaction of workers with First-Line Supervisors and workers with each other were observed to the extent that the researcher could conclude collegiality and assumed mutual-respect during interactions. As explained by the Human Resources Manager of Light Manufacturing Company (pseudonym): "Most of our employees, being from a small community where Light Manufacturing Company (pseudonym) is the major employer, know each other outside of work. We are basically a small sample of a tight-knit community." While individual differences that might affect performance on the job could have existed, none were identified by the research participants or observed by the researcher. None of the workers at the Light Manufacturing Company (pseudonym) facility were members of a bargaining unit and, according to the Human Resources Manager, many were "second-generation employees from families".

The researcher observed counseling sessions of participating First-Line Supervisors with six workers during the research period, with only one of the six workers displaying any adversarial attitude toward the First-Line Supervisor attempting to solve the performance problem identified by the First-Line Supervisor. The foreman of the Inadequate Performance Problem described above, insisted that the performance problem was caused by inadequate workers being available, even after more workers were added to the crew. After two more attempts by First-Line Supervisor 6, following augmentation of the crew led by the foreman, to counsel the foreman as to methods to reduce the overtime and the concurrent insistence of the foreman that the problem was "not enough people to do the job", the First-Line Supervisor

concluded that replacement of the foreman was required. While the foreman did not agree with the First-Line Supervisor's conclusion, the foreman refused to accept fault, but did accept the change in work assignment. First-Line Supervisor 6 consulted with the removed foreman's new First-Line Supervisor and reported to the research that the foreman was performing well in the new assignment.

All workers were eligible for a monetary incentive, dubbed by employees as the "QC bonus", based upon quality of the products manufactured at the facility. A Quality Control Team selected finished products and graded the samples based on a fixed system, which included finish and workmanship. Workers in the highest-scoring department received a one-year, 5%-increase in basic wage. As commented upon by the First-Line Supervisors to the researcher, the desire for the QC bonus by workers "makes them want to do a better job and makes them more open to change to get it".

Chapter 4 Summary

The research methodology used to study how First-Line Supervisors solved performance problems was qualitative action research, used by participating First-Line Supervisors and performed on the job aid used by First-Line Supervisors, the Performance Problem Tool. After a total of twenty-four employees of Light Manufacturing Company (pseudonym) were taught performance improvement principles in a pre-research leadership training course taught by the researcher, a total of eight volunteers, two Managers and six First-Line Supervisors volunteered to participate in the action research. Each participating First-Line Supervisors and one of the Managers used the Performance Problem Tool, knowledge of performance improvement principles, and coaching in problem-solving by the researcher to solve thirteen problems and commence ten more problems using action research. Four of these problems were presented as

examples of the range of problems solved and demonstrating the use made of action research in solving the problems. In addition, the changes made to the Performance Problem Tool by a collaboration of participants and the researcher led to a job aid that was easier to use and more completely included stakeholder for the problems solved and future problems to be solved. Each of the participants acknowledged an increase in problem-solving ability and increased communication skills as a result of the action research in performance problem-solving.

The next chapter of this dissertation presents the conclusions drawn by the researcher and participants regarding the ability of First-Line Supervisors to become effective problem-solvers and the attendant increases in supervisory skills. Limitations of this study as well as recommendations for future research are delineated.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this research was to examine how first-line supervisors at the Light Manufacturing Company (pseudonym), who were trained in basic principles of performance improvement and coached in applying the principles, could improve performance of workers. Action research was used not only to study how those first-line supervisors could implement their newly acquired knowledge and skills to solve worker performance problems, but also to improve the job aid, the Performance Problem Tool, used by the first-line supervisors in the workplace to solve performance problems. Because organizations must depend upon individual performance to meet goals and because the first level of management, the first-line supervisor, is an under-utilized resource to improve productivity, this research study was designed to study how this resource might be used to increase performance. Drucker (2001) described the job of supervisor as a three-part task – identifying, analyzing, and deciding how to intervene on the job to improve performance. Chevalier (2007) emphasized that focusing on performance improvement provides an opportunity for the organization, as well as the individual, to succeed. The need for helping first-line supervisors develop the skills to deal with change affecting the productivity of the workforce is critical in any organization today.

Summary of Results

This section reviews the problem and the research question addressed in this study as well as the action research methodology utilized in this study.

The Problem

Any organization, in order to reach its goals and mission, relies on the individual efforts of members of that organization, and when performance of any member is not sufficient, a performance problem exists. One under-utilized resource to address in the problem of performance improvement is the first-line supervisor. By being able to recognize, analyze, and then facilitate the correction of performance problems, first-line supervisors can become a more valuable part of management. The purpose of performance improvement is not to "fix" employees, but to "develop" them (Chevalier, 2007, p. 2). The research problem is to determine how effective first-line supervisors at Light Manufacturing Company (pseudonym), taught the basic principles of performance improvement and coached in the application of those principles, can be in applying that knowledge and using the skills developed to improve performance of workers.

The Research Question

This research addressed the following research questions that focus on the influence of knowledge of and coaching of first-line supervisors in performance improvement on workers at the Light Manufacturing Company (pseudonym):

- Do first-line supervisors improve worker performance using the basic principles of performance improvement and the job aid?
- How do first-line supervisors implement training and coaching in the basic principles of performance improvement in order to solve worker performance problems?

The major conclusion of this study is that first-line supervisors, when trained and coached in the principles of performance improvement and given the opportunity to apply their knowledge, can be effective as problem-solvers, to the benefit of stakeholders. Further, the use of a job aid, specific to the needs of first-line supervisors as problem-solvers, can aid those first-line

supervisors in not only solving performance problems, but solving problems of other types as well.

The Action Research Methodology

This study was defined as qualitative action research, combining the qualitative aspect of studying people and behavior with the action research aspect of effecting change by means of action in solving performance problems. Action research methodology was utilized not to simply observe the use made of knowledge of performance improvement by first-line supervisors but additionally to aid first-line supervisors in improving skills as communicators and performance improvers.

Discussion of Results

Action research methodology was used in this research because of its value in answering the research question for this study. One means of describing action research also explains its value in this research study: "research *in* action, rather than research *about* action" (Coglan and Brannick, 2010, p. 4). In describing the use of action research as a methodology, Stringer (2014) stated:

> The payoffs for this approach to research are potentially enormous. Not only do research participants acquire the individual capacity to engage in systematic research that they can apply to other issues in other contexts, but they also build a supportive network of collaborative relationships that provides them with an ongoing resource. Solutions that emerge from the research process therefore become more sustainable, enabling people to maintain the momentum of their activity over extended periods of time. Links established in one project may provide access to information and support that build the power of the people in many different ways (p. 16).

These payoffs were realized by the organization and the participants of this research.

The most important results of this research may be grouped into the following groups: (a) training and transfer of knowledge to practice, (b) job experience and problem solving, (c) changes in performance analysis skills of participants, (d) changes in intervention preparation and implementation skills of participants, (e) changes in evaluation skills of participants, including self-evaluation, and (f) value to stakeholders of specific problems solved during research.

Training and the Transfer of Transfer of Knowledge to Practice

Training in principles of performance improvement was conducted by the researcher on a contract basis prior to commencement of this research. After volunteering for this research, each participating First-Line Supervisor and Manager was interviewed by the researcher and taught the fundamentals of the Performance Improvement/Human Performance Technology Model and how to apply the Model to solving performance problems. Included in each interview was coaching in the application of the Model, as applied in the job aid, the Performance Problem Tool, to a performance problem that the volunteer was experiencing at that time.

One week after the initial interview, each of the six First-Line Supervisors had completed initial performance analysis of the performance problem on which the volunteer was working. Each First-Line Supervisor demonstrated knowledge of performance improvement principles both in the way that the First-Line Supervisor had completed the Performance Problem Tool and discussion of the performance problem with the researcher. In subsequent weeks, each First-Line Supervisor chose an intervention based upon performance analysis, implemented the solution, and evaluated the results of the intervention. Two of the First-Line Supervisors were successful on the first intervention chosen and the other four First-Line Supervisors required

additional cycles of action research using the principles learned to successfully solve the problem being confronted.

One of the participating Managers decided to attempt to solve a performance problem to more deeply understand the approach taken by the First-Line Supervisors to solve performance problems. The Manager used the Performance Problem Tool properly and demonstrated understanding of the principles learned to solve the problem. This problem was the Meeting Problem described in Chapter 4 of this dissertation.

As Brinkerhoff (2006) stated,

> …what if we could demonstrate – with convincing evidence – that a person really did learn something new, that they really did use this learning in some important job application, and that this job application led to a worthwhile outcome; would we not have a credible and defensible instance of impact from training?" (p. 9)

Not just "a" person, but all six First-Line Supervisors and one Manager demonstrated just such an impact.

One of the four problems described in Chapter 4 demonstrated a far-reaching impact of successful transfer of training. In the Preventive Maintenance Problem, Supervisor 1 confronted the problem caused by failure of some workers to complete preventive maintenance, with a resultant increase in the amount of corrective maintenance being required, costly to the manufacturing process. (Preventive maintenance includes inspections and other actions that might detect equipment failures that could result in corrective maintenance to repair the equipment.) In devising an intervention to ensure all preventive maintenance would be performed regularly, incidence of corrective maintenance decreased significantly in the part of the facility in which First-Line Supervisor 1 was attempting to solve the performance problem.

When other first-line supervisors and managers learned of the success of the intervention, Supervisor 1 was asked to help them use the same intervention in other parts of the facility. As a result, First-Line Supervisor 1 not only transferred learning to solve a problem in one particular area of the facility, but more areas in the facility as well.

Of importance in the transfer of training knowledge to the job, in addition to the coaching provided by the research, was the support by management for the research. Training will have little chance of success if not supported by the manager and the work environment (Chevalier, R., personal communication, September 24, 2012), a conclusion also supported by other authors. Prior to commencement of the research, the Facility Manager, Operations Manage, and the Human Resource Manager communicated with all first-line supervisors in the facility by correspondence and verbally support for training and application to be made by the training. Further, in interviews, each participating First-Line Supervisor expressed that they felt that they had the support of management to attempt to solve problems in the manner that they had been taught.

Job Experience and Problem-Solving

All of the participating First-Line Supervisors improved communication and observance skills during this research study. All of the First-Line Supervisors had some experience in inter-personal relationships on the job, having been an employee from five to twenty years and having been a supervisors for one to twelve years, depending upon the individual. However, none of the six First-Line Supervisors had been trained or coached in asking questions, listening to the answers, or interpreting the results of communication. All six First-Line Supervisors, when interviewed at the conclusion of the research, stated increased confidence and facility in communicating with other employees in all levels of the facility organization and that the

increase was due to experience in using the techniques taught and coached. During the course of the research, this increase in communication skills was observed by the Researcher. First-Line Supervisor 6 stated: "I could tell people what they were doing wrong, but I rarely listened to them. I was amazed how important listening has become to me by just trying to solve problems."

During the research, four of the six First-Line Supervisors solved more than one problem during the research and were in the process of solving more problems upon conclusion of the research period. Through statements made by each of the four First-Line Supervisors and observation of the Researcher during action research cycles solving problems, these four First-Line Supervisors became more confident in their abilities as problem-solvers through experience in solving problems applying performance improvement principles. In addition, each of the six First-Line Supervisors expressed that the performance improvement principles became more ingrained in the approach to problem-solving based upon the experience gained during the research. First-Line Supervisor 2 commented: "When I got used to analyzing before I acted to solve a problem, I started to realize that I didn't have to 're-invent the wheel' as I took on each new problem." Experience based upon use of the job aid, the Performance Problem Tool, was evidenced by the changes suggested by the First-Line Supervisors to improve the job aid. "The researcher must provide the opportunity…for participants to understand their own experiences in terms that make sense to them" (Stringer, 2014, p. 137)

The job aid, the Performance Problem Tool, had the value of helping the user to focus their thinking by analyzing each problem before moving immediately to assumptions about the cause of the problem that were not based upon analysis. First-Line Supervisors 1 and 2 were emphatic in comments made during the final interview at the conclusion of the research that the

changes made to the job aid, based upon the experience in using the job aid, made the job aid not only easier to use to solve all types of problems but also easier to apply in performance problem-solving. "The only source of knowledge is experience." (Albert Einstein)

Changes in Performance Analysis Skills of Participants

The experience of the participating First-Line Supervisors and Managers during the research supported the contention of R. Chevalier that "…many senior managers spend most of their time trying to 'fix their employees,' when it's the work environment that needs to be fixed (Chevalier, R., personal communication, September 14, 2012). Rummler (2007) forwarded the oft-repeated notion that: "Put a good performer in a bad system, and the system will win every time" (p. 55). The experience of the participating First-Line Supervisors in this research provide a basis for accomplishing a goal of Gilbert: performance improvement could be improved by finding the missing support factors and supplying them to workers.

All six First-Line Supervisors, as well as Manager 2, stated that experience in solving problems using the principles of performance improvement during this research had influenced their approach to problem-solving. First-Line Supervisor 3 stated: "I have to admit: I had a tendency to blame the worker first when a problem appeared. Now I know to analyze the problem first and, if it led to being the worker's fault, then I would deal with that." By performing effective front-end analysis, the participating First-Line Supervisors found, far more often than not, that the cause of performance problems lay with factors other than the individual workers. One of the best examples of this is First-Line Supervisor 1 finding that the best solution to the problem of preventive maintenance not being performed was to construct a job aid that helped workers to perform required preventive maintenance in a timely manner.

During the course of the research, all participating First-Line Supervisors grew in confidence in the ability to solve problems. As First-Line Supervisor 3 stated: "Before, I sometimes put off solving a problem. But now I know that, if I go ahead and solve a problem, my life gets easier." Not only did the Researcher observe the growing confidence of the First-Line Supervisors as problem-solvers but also the interest that other managerial personnel began to take in the successes of the participating First-Line Supervisors. Evidence of this observation included the expressed desire of managerial personnel who asked for assistance from First-Line Supervisor 1 in setting up preventive maintenance tracking programs that Supervisor 1 developed as a job aid.

The participating First-Line Supervisors universally expressed the view that the "look, think, act" approach to action research of Stinger was an effective approach to problem-solving. First-Line Supervisor 2, in the closing interview with the Researcher, said: "It's simple and easy to understand. But it gets the problem solved."

Changes in Intervention Preparation and Implementation Skills of Participants

All of the participating First-Line Supervisors had at least one year of experience as a supervisor and had some skill in problem-solving, based upon that experience. All First-Line Supervisors, based upon data supplied in initial interviews, had no experience applying the principles of performance improvement or utilizing the Performance Improvement/Human Performance Technology Model to solve performance problems through devising, implementing, and evaluating interventions. As First-Line Supervisor 2 commented during the research: "I like having a pattern to follow to help me figure out what to do to solve a problem." First-Line Supervisor 4 stated: "Now I know that I can pick a solution, try it, and then learn from it if it doesn't solve the problem."

During the research study, every participating First-Line Supervisor observed that the "simplest solution was often the best solution" to performance problems addressed. As an example of this approach to choosing interventions for problems, such as the Marred Surface Problem described in Chapter 4 of this study, several different potential causes were envisioned by Supervisor 2 at the beginning of the performance analysis to eliminate the marred surface of one product being manufactured at Light Manufacturing Company (pseudonym). First-Line Supervisor 2 was able to envision an intervention for each potential cause based upon the nature of the cause of the problem. In each round of action research, First-Line Supervisor 2 was able to eliminate one possible cause and the associated intervention until finding that the probable cause of the marred surfaces was not a performance problem, but rather a problem in the workflow on the production line. The intervention implemented was a simple one, slightly altering the pattern of the workflow by changing the method of handling raw materials in the actions of one member of the workforce. This simple intervention did not involve any added cost, at least in the short-term of this research study, but was evaluated as being the proper intervention to solve the problem.

The process of finding the proper intervention to solve the marred surface problem demonstrated the value of planning and evaluating possible interventions in a manner that permitted solving the problem with the least amount of disruption in the production process and the least amount of effort and money to reduce or eliminate the problem. Other First-Line Supervisors were able to increase skills as problem-solvers in a similar manner, as demonstrated by observation of the Researcher and comments made by the First-Line Supervisors. As Supervisor 6 stated: "I was a little hesitant to use this way of solving problems at first, but now see how easy it is to use and get results."

Changes in Evaluation Skills of Participants, Including Self-Evaluation

"It wasn't that I had not solved performance problems before; I had. But I see now why some of the problems I thought I had solved would happen again" (First-Line Supervisor 1). This statement was made by First-Line Supervisor 1 in a closing interview at the end of this research study. As the First-Line Supervisor went on to explain, not enough effort was spent "looking and thinking" prior to trying to solve a performance problem and then evaluating the intervention chosen to eliminate the problem. Each of the other First-Line Supervisors expressed a similar attitude, that further evaluation, including self-evaluation, during analysis, intervention development and implementation, and then reviewing the effectiveness of the intervention required a small amount of effort, but produced far better solution to problems. In other words, more effective "looking and thinking" made "acting" far more effective. During the study, the Research observed that each First-Line Supervisor became skilled in asking more open-ended questions and were able to obtain better data to solve problems. Each First-Line Supervisor appeared to listen to the answer to the questions in a manner that was conducive to involving the workers in the problem-solving effort but also reduced the reliance of the First-Line Supervisors on pre-conceived beliefs about workers. Less time was spent on analysis based on assumption and more time was spent on facts gleaned from listening to the answers to questions.

Through practice in solving problems, First-Line Supervisors asked better questions, became better listeners, and devised interventions that were more appropriate to solving problems. With the assistance of coaching by the Researcher during the study, each First-Line Supervisor became adept at using the action research approach to evaluate all phases of the problem-solving effort.

> In keeping with the principles of action research…evaluation is not carried out by an outside evaluator to make judgments about the worth, effectiveness, success or failure of a project. It is a process that enables those engaged in the research project to learn from their own experiences" (Stringer, p. 205)

Value to Stakeholders of Specific Problems Solved During Research

Stakeholders were included in the action research conducted by the participating First-Line Supervisors in many ways, as illustrated by the four problems described in Chapter 4 as well as other problems encountered by participants in this research study. Stakeholders are individuals who gain directly from the improvement in performance of one or more other individuals. Broad (2005) stated that a stakeholder in a system is "an individual, group, or organizational component, or organization with a share or interest – a stake – in the goals or operations of an activity, process, project, organization, or intervention in a complex system" (p. 7). Combs and Falletta (2000) asserted: "A stakeholder is anyone who is directly or indirectly affected by an HPI intervention or evaluation" (p. 15). Primary stakeholders are personnel most affected by a specific change, whether positively or negatively, and include personnel such as supervisors, managers, and workers. Secondary stakeholders are personnel who are not directly affected by a change in an organization but have some interest in the effects of change, such as other managers, supervisors, and workers not specifically affected by change and the consumers of Light Manufacturing Company (pseudonym) products.

Meetings Problem and Manager 2: In the Meetings Problem, first-line supervisors were meeting directly with the manager to whom they reported, but were not using the information received in the manner intended by their manager. Primary stakeholders for the Meetings Problem were Manager 2 and the first-line supervisors reporting to Manager 2 as well

as the workers directly supervised by the first-line supervisors. Secondary stakeholders included other Company personnel, other than Manager 2, and other first-line supervisors who were not participating in the meetings.

The value to the primary or secondary stakeholders to the intervention selected by Manager 1, while not measurable in economic terms, was inferred by the reaction of the affected first-line supervisors and Manager 2. All reported that communication was improved and that the resulting flow of information up to and down from Manager 2 also improved. As stated by Chevalier (2007):

> A high-performing workgroup is more than just a group of high-performing individuals; it is a group of individuals who function well together. There are three main components to the task of building high-performing teams: *selection in* of the right people who make up the team, *development* of the players as individuals and as a team, and *selection out* of those who do not perform at the expected level" (p. 73).

By implementing the intervention of telling the affected first-line supervisors what was expected of them, changing the time and content of meetings, and encouraging feedback and free exchange of information, Manager 2 was able to improve the teamwork in a manner that includes all of the factors important to effective teamwork.

The value to secondary stakeholders of improved teamwork, made more likely by the intervention of Manager 2, include the possibility of manufacturing more efficiently, creating the high quality products that are the goals of both the Light Manufacturing Company (pseudonym) and the consumer.

Marred Surface Problem and First-Line Supervisor 2: In the Marred Surface Problem, panels used as part of the production of one product of the Light Manufacturing

Company (pseudonym) were found to have three small indentation, each about the size of a dime, on the smooth side. Primary stakeholders for the Marred Surface Problem were First-Line Supervisor 2, the Facility Manager, and workers throughout the facility. Secondary stakeholders were other first-line supervisors as well as consumers of the product manufactured at Light Manufacturing Company (pseudonym).

The value to primary stakeholders to the intervention of First-Line Supervisor 2 were directly measurable, including lower production costs with no expenditure to correct the problem, other than the time of First-Line Supervisor 2. The value to the secondary stakeholders include higher profitability of Light Manufacturing Company (pseudonym) and higher quality of products available to the consumer.

Inadequate Performance Problem and First-Line Supervisor 6: In the Inadequate Performance Problems, one of three work crews reporting to First-Line Supervisors 6 was not completing assignments satisfactorily, requiring overtime for each crew member to successfully complete assigned task. Primary stakeholders for the Inadequate Performance Problem were First-Line Supervisor 6, the Facility Manager, and workers in the crews. Secondary stakeholders were other first-line supervisors as well as consumers of Light Manufacturing Company (pseudonym) products.

The value to primary stakeholders to the intervention of First-Line Supervisor 6 were directly measurable, including lower operating costs and increased production of products. Operating costs were reduced primarily because overtime costs for work crews were eliminated. Yet, by implementing the intervention, no expenditure was made to correct the problem, other than the time of First-Line Supervisor 6 in implementing the intervention. The value to the

secondary stakeholders include higher profitability of Light Manufacturing Company (pseudonym), with decreased production costs.

Preventive Maintenance Problem and First-Line Supervisor 1: In the Preventive Maintenance Problem, poor preventive maintenance by workers was causing more frequent corrective maintenance for equipment, not only disrupting production, but also increasing the maintenance cost to the facility. Primary stakeholders for the Preventive Maintenance Problem were First-Line Supervisor 1, the Facility Manager, and workers throughout the facility. Secondary stakeholders were other first-line supervisors as well as consumers of Light Manufacturing Company (pseudonym) products.

The value to primary stakeholders to the intervention of First-Line Supervisor 1 were directly measurable, including lower maintenance costs, increased production of products, and decreased maintenance cost, with no expenditure to correct the problem, other than the time of First-Line Supervisor 6. Further, the good practices example of the intervention by First-Line Supervisor 6, leading to more interest in other parts of the facility, could lead to further production efficiency and lower costs. The value to the secondary stakeholders include higher profitability of Light Manufacturing Company (pseudonym) and higher quality of products available to the consumer.

Other Problems Solved by First-Line Supervisors

Other problems solved varied in value to stakeholders, with the difference being the nature of the problem being solved. First-Line Supervisor 2, for example, solved the problem of the presence of defective parts in one product of Light Manufacturing Company (pseudonym) by implementing a change in the type of raw material used in production. The presence of the defective part was eliminated, with no increased cost for the raw material or any decrease in

quality of the finished product. First-Line Supervisor 3 solved a problem caused by lack of proper training of workers using a specific tool to finish products, at no cost to Light Manufacturing Company (pseudonym), but improved quality of the finish on the products.

Of importance is the increased attention from management to the First-Line Supervisors who solved problems in this research. The value to managers of the problems solved during this research were apparent and were reflected in comments by participants during interviews at the close of this research study. "Equally important to solving problems is gaining commitment from senior management and other stakeholders or champions to support and sustain the interventions" (Van Tiem, Moseley, & Dessinger, 2012, p. 8).

Discussion of the Results in Relation to Literature

The results of this study are directly connected to the literature reviewed in preparing to conduct this study. The areas of the literature related to this study included: (a) organizations as systems, (b) supervisors and problem-solving, (c) performance improvement and the Performance Improvement/Human Performance Technology Model, (d) behavior engineering model, (e) business coaching, (f) experiential learning, (g) transfer of learning, (h) qualitative research, and (i) action research.

Organizations as Systems

Viewing the Light Manufacturing Company (pseudonym) as a system permitted both the participating First-Line Supervisors and the Researcher to perform their roles in the research. By understanding the organization and its interrelated parts, participating First-Line Supervisors improved their ability to identify stakeholders, both primary stakeholders and secondary stakeholders, affected by specific problems and the value of including those stakeholders in analyzing and solving those problems. By understanding the Light Manufacturing Company

(pseudonym) organization, the Researcher had more context for each performance problem and was able to coach participating First-Line Supervisors in improving as problem-solvers.

Each participating First-Line Supervisor, used knowledge of the organization as a system in problem-solving and improved their ability to identify the inputs, outputs, and process leading from one to the other as identified by Broad (2005) as the value of viewing organizations as systems. The Performance Problem Tool not only aided the participating First-Line Supervisors in analyzing performance problem context, but also aided in evaluating how solutions to those problems influenced functioning of the organization.

The literature emphasized the importance of support by stakeholders, whether worker or other first-line supervisor or higher level of management, of any change in the organization necessitated by performance improvement efforts. Support by stakeholders in the transfer of learning was described by many researchers as critical to success of the learners (Baldwin & Ford, Baldwin & Magjuka, Brinkerhoff & Montesino, Feldstein & Boothman, Pucel & Cerrito, Seitz, and Xiao). In all of the research cited, support, whether direct or indirect, was important to success. By including stakeholders in the planning, implementation, and evaluation of interventions, participating First-Line Supervisors were better able to communicate with stakeholders as well as develop criteria for evaluation of solutions that were valuable to those stakeholders.

While the specificity of the performance problem being assessed by participating First-Line Supervisors in this research study differed, the value of stakeholder inclusion in all parts of the analysis and solution process was readily identified by both problem-solver and researcher. One of the most valuable results for the participating First-Line Supervisor was predicted by

Stringer (2014): "…they will extend their understanding of the organization and aspects of its operation relevant to their problems, issues, and concerns" (p. 152).

Supervisors and Problem-Solving

Many experts in business organizations, notably Drucker and Deming, pointed out the importance of management in increasing productivity by solving performance problems. Drucker (1973) reasoned that: "No organization can function well if its supervisory force does not function. Supervisors are, so to speak, the ligaments, the tendons and sinews, of an organization. They provide the articulation. Without them, no joint can move. It is the supervisor's job to be in the middle. Hence he [sic] must have responsibility, function, and respect in both his relationships, upward to management and downward to the work group" (pp. 280-281). According to Deming (1983), "First-line supervisors should find causes of trouble and not just chase anecdotes. They need information that shows when to take action, not just figures that describe the level of production and the level of mistakes in the past" (pp. 201 - 202). Lane, Malkin, Shanken, and Cavendish (2008) advocated: "Practice involving employees in … problem-solving, instead of just telling them what to do" (p. 95).

Yet few organizations aid first-line supervisors in preparing for that role. As a review of the literature reveals, preparation of supervisors to assume the role of a supervisor is limited, at best, and incomplete in scope for the limited preparation being performed. Herzberg (1968) advanced the concept of motivators versus hygiene, with motivators being the factors that promoted good performance and hygiene being the factors that promoted inadequate performance. Motivators included factors such achievement, recognition for the achievement, and opportunity for advancement within the organization. Hygiene included such factors as quality of supervision, working conditions, and inter-personal relationships. Further, "presence

of the motivating factors can lead to job satisfaction, while absence will create little or no job dissatisfaction (Herzeberg, 1987, p. 57).

Job enrichment, applying motivating factors with de-emphasis upon hygiene factors, is regarded by many researchers as the best means by which to increase performance (Gilbert, Chevalier, Rummler, and Van Tiem, Moseley, & Dessinger). Gilbert (2007), advanced the view that: "For any given accomplishment, a deficiency in performance always has as its immediate cause a deficiency in a behavior repertory…, or in the environment that supports the repertory…, or in both. But its ultimate cause will be found in a deficiency of the management system…" (p. 76). Solving performance problems can be viewed as a means of job enrichment for workers as well as first-line supervisors. Chevalier (2007) defined job enrichment as: "…a way you can build opportunities for individuals to fulfill their higher-level needs by providing chances for achievement, responsibility, recognition, personal growth, and enjoyment of the work itself" (p. 188). Van Tiem, Moseley, and Dessinger (2012) further described job enrichment as a "…job design option that makes a job more rewarding and satisfying" (p. 297).

While a major duty of supervisors is to ensure competent performance of workers, preparation of a supervisor to perform this function except for a limited amount of training, was not apparent. First-line supervisory training for many organizations, based upon review of stated training objectives, consists of learning the rules and regulations, company brand, and disciplinary methods (based upon personal communication from R. Chevalier and experience of the author). Lane, Malkin, Shanken, and Cavendish (2008) list a common complaint of many new first-line supervisors is lack of training (p. 11). Kirkpatrick and Kirkpatrick (2006) emphasize the importance of evaluating first-line supervisory training before they are trained to ensure the training is what the first-line supervisors need to be effective (p. 54).

Rummler and Brache (1995) and other performance experts describe that, about four times out of five, resolution of a performance problem does not lie with the performer, but with the managers and first-line supervisors responsible for the performance. As added by Broad (2005), "There is another good reason to avoid selecting training as the solution without careful analysis of other factors. Instruction interventions are often significantly more expensive than other possible solutions" (p. 44). The benefit of the training must be measurable and obvious before embarking on extensive training as the solution to any performance problem.

Even in the training offered by some organizations as the only means of preparation for supervisors, the scope of training in the few organizations that offer such training does not include training in problem-solving. Yet improvement in performance of workers remains the stated goal of most organizations and, as supported by the review of literature, can be nothing if not more important in the future of organizational development. While information on supervisory training from groups such as the American Society for Training and Development (ASTD) reveal limited application of training to preparing first-line supervisors as supervisor, no evidence could be found of preparing first-line supervisors to be performance problem-solvers.

Drucker (2001) described the job of first-line supervisor as a three-part task – identifying, analyzing, and deciding how to intervene on the job to improve performance. Few organizations have been found to have formal programs to aid new or potential first-line supervisors to become effective first-line supervisors, based upon Drucker's definition. This research provided an opportunity to demonstrate how preparing even a few first-line supervisors to assume the role of problem-solvers could provide benefit to not only to the stakeholders directly involved in the problems but also to the organization as a whole.

Performance Improvement and the Performance Improvement/Human Performance Technology Model

Performance improvement was defined by Van Tiem, Moseley, Dessinger to "include theories of systems, quality, communications, learning, human resources, organizational design and development, and more" (p.xxxv). Chevalier (2007) added a major benefit of performance improvement to an organization: "Performance improvement provides an overall game plan for interacting with employees" (p. 2).

The Performance Improvement/Human Performance Technology Model is a systematic approach to gaining improvement in performance of individuals as well as the organizations of which the individuals are a part. The major elements of the Performance Improvement/Human Performance Technology Model are (a) performance analysis of need or opportunity for improvement, (b) selection of one or more interventions based upon the performance analysis, (c) implementation of the intervention(s), and (d) evaluation of all phases of the activity of the Model. (Van Tiem, Moseley, & Dessinger, 2012, p. 43).

Performance analysis aids problem-solver to define not only the desired level of performance of a worker or workers but also the existing performance level in order to understand the nature of the cause of the identified performance problem. Rummler and Brache (1995) and other performance experts describe that, about four times out of five, resolution of a performance problem does not lie with the performer, but with the managers and first-line supervisors responsible for the performance.

Intervention selection is the process of determining which of the possible solutions to a particular performance problem is most likely to close the performance gap and improve performance. The selection of intervention or combination of interventions should be based

upon "outcomes or results, impact, value, costs, and benefit to the organization and the situation" (Van Tiem, Moseley, & Dessinger, 2012, p. 47). The selection of intervention(s) should also be based on "a reasonable goal that can be met in a short time, such as three months to a year…The reasonable goal should be described using the same quantity, quality, time, and cost as used for the baseline analysis. The reason for setting a reasonable goal is to give the employee a target that can be met in short order and relatively easily, and which, when met, will provide the motivation to continue meeting higher goals" (Chevalier, 2007, p. 90).

Implementation of an intervention or set of interventions to improve performance flows from the performance analysis and may be improved with the support of stakeholders, yet another reason to involve stakeholders in all phases of performance problem-solving. Evaluation is important in all phases of the performance problem-solving process. Kirkpatrick (1997) advanced the notion that: "The most common reason for evaluation is to determine the effectiveness of a program and ways in which it can be improved" (p. 16). "Measuring application and implementation is critical to understanding the success of project implementation. Without successful implementation, positive business impact will not occur – and no positive return will be achieved" (Phillips & Phillips, 2007, p. 83)

The initial design of the Performance Problem Tool, the job aid used in this study, was based upon this Performance Improvement/Human Performance Technology Model. During the action research performed to improve the job aid, the Model was used in all instances of revision.

Behavior Engineering Model

For the decades since Gilbert developed the Behavior Engineering Model (BEM), it has permitted a methodical examination of both the environment of a job or task and the performance of an individual within that environment, in a coordinated manner. Gilbert

followed the time-motion studies of Taylor, pursuant to the industrial revolution, with the idea that the problem with human performance in a job is the *job* and not the *human*. Gilbert (1978) postulated that: "Absence of performance support (not skills and knowledge) is the greatest block to exemplary work performance" (p. 32). The elements of the Behavior Engineering Model, examining both the environment and the individual, was used as a lens through which the most important functions of supervisors were viewed. "Gilbert took us far beyond training toward a rigorous, observation-based approach to improving performance" (Dean, 1997, p. 46).

The original model created by Gilbert has been modified since the inception of the Behavior Engineering Model. While several changes have been made by various authors, such as Binder's Six Boxes (2005), the version of the Behavior Engineering Model developed by Roger Chevalier was utilized in this research. The Updated Behavior Engineering Model formed the basis of a part of the Performance Problem Tool and was used in performance analysis to define the problem and the cause of the problem in iterative action research cycles to solve problems in this research. As predicted by Chevalier and Rummler for all performance problems, most performance problems in this research study were found to result from the environment than from the individual.

Business Coaching

As described in the literature, coaching is a type of intervention that is increasingly used as a method of improving employee performance (de Janasz & Sullivan, 2004). Bacon and Spear (2003) defined coaching: "Coaching is intended to improve skills and ultimately workplace performance" (p. 9). In addition, Bacon and Spear (2003) also described the directive coach: "Directive coaches believe that they help best by teaching and advising; by sharing their knowledge, experience, and perspective; and by observing others perform and giving feedback

and corrective suggestions on what they've observed" (p. 87). The directive coach is an appropriate coaching style for a first-line supervisor, as demonstrated in this research study.

One type of coaching, called adaptive coaching, was particularly suited to this research with first-line supervisors because it applies knowledge to actual performance problem and also increased communication and teamwork with workers, other supervisors, and managers. Bacon & Spear (2003) provided an important reason to use the adaptive coaching style: "…some clients want to be given advice and direction; others (most others, in fact) prefer the coach to ask questions and guide but not direct them" (p. xxxiii). Adaptive coaching was found to be appropriate in all phases of this research for all participating First-Line Supervisors and yielded increased supervisory skills in each First-Line Supervisor, especially with regard to communication with workers and stakeholders.

Experiential Learning

Experiential learning is learning that occurs based upon the experience of the learner. Experiential learning is learning that occurs based upon the experience of the learner and emphasizes the role that experience has in the learning process (Kolb, Boyatzis, & Mainemelis, 1999, p. 2). This research combined experiential learning of supervisors both in training and in practice to recognize performance problems, to cause workers to improve performance, and to evaluate the results of interventions to improve performance.

Transfer of Learning

Transfer of learning to use of that learning is one of the largest challenges facing anyone who desires to increase performance in the workplace. For the transfer to take place, any knowledge or skills gained in an intervention, such as training, is actual use of the knowledge or skills gained in the workplace. A number of different literature searches and research efforts

supported the view that training was not transferred as was commonly assumed up until the 1950s. Training will have little chance of success if not supported by the manager and the work environment (R. Chevalier, personal communication, September 24, 2012).

The most commonly used evaluation device for training that of Kirkpatrick's four-level framework, was also used to measure transfer of learning to the job of performance improvement in this study. The four levels were incorporated into the formative and summative evaluations of participants as well as in the confirmative evaluations, to the extent possible, in this research. Kirkpatrick's level 3 (job performance) and level 4 (organizational results) formed the basis, wherever possible, of the confirmative evaluation and meta evaluation of this research. Work by Phillips and Phillips (2007) resulted in a fifth level, return on investment (or ROI) being included to quantify the performance improvement, if possible. Transfer of learning was observed and evaluated to form a basis for adaptive coaching during this study.

Combining training in performance improvement principles, coaching in applying the knowledge to actual performance problem-solving, and evaluating the results of problem-solving efforts combined to permit participating First-Line Supervisors to transfer the learning to application on the job as a performance problem-solver.

Qualitative Research

Qualitative research was defined in the literature as a method of explaining in a thorough manner, and in understandable terms, an individual or a group of individuals and their actions and reactions in their surroundings. Gall, Gall, and Borg (1993) advanced the idea that: "The purpose of qualitative research is to develop an understanding of individuals and events in their natural state, taking into account the relevant context" (p. 194). Stake (1995) described a "distinction between explanation and understanding as the purpose of inquiry" (p. 37). Use of

description of people and what those people do as well as where they do it are important to understanding and analyzing whether supervisors can improve performance of workers.

Description provides a means of making decisions by participants, evaluating decisions and actions of other people, and the change that occurs in people as a result of their decisions and feedback information. Creswell (2009) described qualitative research as "a form of interpretive inquiry in which researchers make an interpretation of what they see, hear, and understand" (p. 176). This method of research provides far more detail that is important to and causes action as well as change in action of individuals. Both Creswell (2003) and Stake (1995) emphasize that what is known, what is to be discovered, and methods of discovery must be suitable to the research questions as well as to the researcher. Qualitative description makes use of artifacts as well as data encountered by the researcher in analysis of what the researcher observed, thought, and felt during the research. Merriam (2009), in describing strategies to promote reliability and validity for qualitative research, stated that "rich, thick descriptions" provide a "written context for all data collection procedures and processes" (p. 229). A rich, thick description *paints a picture* for the outside reviewer of the research.

Action Research

Action research facilitates the transfer of training to the job and also permits refinement of the performance improvement job aid, the Performance Problem Tool. Coghlan and Brannick (2010) emphasized that, in addition to the action(s) being examined, that action research is a collaboration between equal partners in the action and measurement of the action, research is concurrent with the action, and action research is not only a set of events but the act of problem solving at the same time (p. 4). Action research was defined by Coghlan and Brannick (2010) as "research *in* action, rather than research *about* action" (p. 4).

By teaching and then coaching first-line supervisors in principles of performance improvement, the participants increased their skills at worker performance improvement by their own actions. "Action research enacts localized, pragmatic approaches, investigating particular issues and problems in particular sites at particular moments in loves of interacting individuals and groups" (Stringer, 2014, p. 61). In addition, improvement in the job aid, the Performance Problem Tool, occurred as a result of actions of the participating First-Line Supervisors.

Limitations

The limitations of this action research study of problem-solving by first-line supervisors included: (a) limited time available for the study, (b) size of the sample studied, (c) specificity of the portion of the organization studied, and (d) inferential bias of the Researcher. A discussion of the limitations and the means by which these limitations might be mitigated in future research follows.

Limited Time of the Study

The period of this research study was three months, as pre-determined by the researcher in consultation with management of Light Manufacturing Company (pseudonym). The problems that confronted the participating First-Line Supervisors could be representative of that portion of the calendar year, in the instance of this research, the spring season of the year. While none of the problems appeared to the Researcher to be seasonal in nature, and as confirmed by the participating First-Line Supervisors and Managers, a year-long study would reduce the possibility that seasonally-caused problems were ignored.

While all participating First-Line Supervisors demonstrated to the Researcher capability as problem-solvers, the limited time of the research study did not result in confirmation in the long-term. Kirkpatrick (2005) emphasized the importance of time to "internalize concepts and

making lasting changes. [Time] gives people time to think about concepts, practice principles, get feedback, make adjustments, overcome stumbling blocks, and try again" (p. 161) Applying action research principles and coaching aided the First-Line Supervisors in overcoming the need for time in gaining experience in problem-solving. A longer-length study would permit further development of each participant as a problem-solver.

While the three-month period of time was deemed to permit answering the research question, complete confirmative and meta evaluation of the action research was restricted. Confirmative evaluation, in the context of this research study, is a long-term evaluation of the effectiveness of the results of the study and the interventions selected as the solutions to the problems solved by the participating First-Line Supervisors. The length of time required for confirmative evaluation varies between the performance problems being solved as well as this research study. While confirmation of the effectiveness of this study may be inferred by the Researcher and the statements made by participating First-Line Supervisors and Managers, confirmative evaluation of the results should continue following this study.

Meta evaluation can best be defined as an evaluation of the other evaluations. Type I meta evaluation is performed during formative and summative evaluations and Type II meta evaluation is performed after all of the other forms of evaluation (summative, formative, and confirmative evaluation) are complete (Van Tiem etal). Type I meta evaluation is an integral part of the action research methodology, as meta evaluation was performed by the participants as well as the Researcher during the action research-based problem-solving process. For some problems solved by the First-Line Supervisors, Type II meta evaluation might be inferred, but not, in fact, truly completed. For example, First-Line Supervisor 6, after repeated attempts to solve the poor performance of a lead worker in a maintenance crew, chose replacement of the

lead worker as the only lasting solution to eliminate the poor performance. While this intervention was evaluated to be a successful solution to the poor performance problem by both First-Line Supervisor 6 and the Researcher for the six-week period following the implementation of the solution, further observation of the maintenance workers in all of the crews over six months to a year would confirm this evaluation.

For other performance problems, neither confirmative evaluation or Type II meta evaluation were possible during the research and could not be inferred. Formative and summative evaluation of the solution of Manager 2 to the meetings problem were positive for the intervention selected. (In the meetings problem, first-line supervisors who reported to Manager 2 were not using information from the meetings in an effective manner.) Manager 2 used self-evaluation and changed the manner, timing, and content of the meetings with first-line supervisors as an intervention. While confirmative evaluation of this intervention was initially inferred by Manager 2 to have improved the effectiveness of the meetings, a complete confirmative evaluation as well as a Type II meta evaluation was deemed by the Researcher to require at least six months to critically evaluate the intervention.

Another limitation was the time spent by the Researcher with each participating First-Line Supervisor with regard to problem-solving. Some actions of the First-Line Supervisors in problem-solving were not observed and some thoughts went unobserved and un-recorded. Regardless of the time available to observe and discuss problems being undertaken to solve by the First-Line Supervisors, this limitation could not likely be reduced to any extent.

Size of the Sample

Purposive sampling was chosen as the method of sampling for this action research study. As described by Borg, Gall, and Gall (1993): "In this method the researcher selects a case, or

cases, from which they can learn the most" and "[the researcher] selects criteria because [the researcher] believes that they will result in collection of a clique that is manageable for the purposes of data collection and that will exhibit the phenomena of interest" (p. 101) Criteria selected for the supervisor clique for this purposive sampling were: (a) each participant has been designated a first-line supervisor, (b) each supervisor is known by other supervisors, managers, and workers to hold the position, (c) the total number in the clique is at least five, (d) each supervisor performs as a supervisor on a regular basis, (e) clique members are willing to be interviewed and observed regularly, and (f) clique members who discontinue participation during the period of the three months of the research are willing to be interviewed regarding the reasons that each discontinues participation.

Each participant was trained, coached, interviewed, and observed by one researcher. Each of these processes requires time to be effective. In order to provide sufficient time for each of these processes, inclusion of more than ten supervisors would not be *manageable* by the researcher. Since a goal of the research was to establish collaborative relationships with the supervisors initially and then develop those relationships during conduct of the study in order to facilitate coaching and action research, a working group of five was estimated as ideal. In fact, six first-line supervisors from a total of twenty-four who attended the leadership training course prior to the beginning of the research study, volunteered to participate in this study.

While the number of participating First-Line Supervisors was limited in number, that number was sufficient to permit the Researcher to draw conclusions with regard to the research. As Brinkerhoff (2006) stated, "…what if we could demonstrate – with convincing evidence – that a person really did learn something new, that they really did use this learning in some important job application, and that this job application led to a worthwhile outcome; would we

not have a credible and defensible instance of impact from training?" (p. 9). Since this research went further than training and included concerted effort to aid supervisors in applying knowledge, including coaching and action research and a job aid, the Researcher could more definitively recognize success as problem-solvers among the participants. Using Brinkerhoff's stated definition for success, not just one First-Line Supervisor, but all six First-Line Supervisors, were able to improve in ability to solve performance problems, making the case that the action research study was successful as well as worthwhile to stakeholders.

Specificity of the Sample

This research study was conducted to one specific part of an international organization, the Light Manufacturing Company (pseudonym). Further, the division of Light Manufacturing Company (pseudonym) in which this research was conducted is located in a specific area of the U.S. that may be characterized as a rural community in which the Light Manufacturing Company (pseudonym) is the major employer in the community. As stated by Stringer (2014): "Action research therefore is based on the proposition that generalized solutions, plans, or programs may not fit all contexts or groups to whom they are applied and that the purpose of inquiry is to find an appropriate solution for the particular dynamics at work in a local situation" (p. 6).

For further study of the action research approach to improving performance in a different organization or in any other part of the Light Manufacturing Company (pseudonym) could be more inclusive in context and of groups of first-line supervisors. For purposes of this action research study, in the words of Stringer, the participating First-Line Supervisors were able to find "appropriate solutions for the particular dynamics at work in a local situation.

Inferential Bias of Researcher

As Borg, Gall, and Gall (1993) stated about bias in action research: "Because the researchers tend to be personally involved, bias is typically present" (p. 398-399) The researcher bias in inferences of data and artifacts can skew the action research process in a direction other than its natural course. Through use of a rigorous method of data collection, reflection, and description, the Researcher attempted to detach the pre-conceived inferences and bias at a minimum during action, but also strove avoid impeding action.

Of note is the inferential bias that could have been present exclusive of the Researcher, including the *Hawthorne Effect*. The *Hawthorne Effect* is an assumed effect of positive influence on action simply by being a participant in research. While detailed research by Jones (1991), and other researchers, points to lack of existence of such an effect, the existence of this effect on the participating First-Line Supervisor is viewed by the Researcher as a positive effect rather than a negative effect. Whatever contributes to the success of First-Line Supervisors in solving performance problems, whether lasting or temporary, could only result in a positive outcome for stakeholders in any particular problem solution.

Implication of the Results for Practice

Implications of the results of this qualitative action research study of the effectiveness of first-line supervisors as performance problem-solvers for practice include: (a) preparation of the support system, (b) training of participants, (c) coaching of participants, (d) job aid development and use, and (e) use of action research.

Implication 1: Preparation of Support System

Preparation of first-line supervisors to be more effective performance problem solvers requires far more than training of supervisors. While an overt objective of any training program is to increase the knowledge of all trainees, a true measure of the success of training is use by the

trainees of the knowledge gained. Brinkerhoff (2006) pointed out that as much as 80% of trainees do not apply learning on the job and "…failures of training to achieve results are not caused by flawed training interventions, they are caused by contextual and performance system factors that are not aligned with and were otherwise at odds with the intended performance outcomes of the training" (p. 23). Developing a training effectiveness support system is an essential part of increasing the likelihood that supervisors will apply knowledge to improve performance.

A training effectiveness support system can include such factors as recognition of successes in performance improvement, showing interest in supervisors, tying performance to incentives, providing opportunities for growth and advancement, and, most important of all, providing the conditions in which the trainee can succeed (Kirkpatrick). Support of stakeholders not only provides the conditions for the first-line supervisor to use training knowledge but also provides data as well as ideas for the first-line supervisor to use in solving performance problems. Primary stakeholders, such as upper and middle level managers as well as the first-line supervisors themselves, should not only be aware of the preparation effort but be included in the planning and execution of the preparation intervention. Primary stakeholder support following the training cannot be over-emphasized. Support of secondary stakeholders, such as employees and consumers of the products of the organization, while not being overtly involved in preparation, must still be considered in the planning and evaluation of first-line supervisor preparation.

Establishing measurable goals is just as important to preparing first-line supervisors as problem-solvers as it is to helping first-line supervisors plan problem-solving and evaluate the interventions implemented in performance improvement. Just as the nature of the problem being

solved by a first-line supervisors varies between problems, so do the nature of the measurable goals. While achievement of some goals may be exact and immediate, such as time-saving or cost-saving, others are less exact or immediate, such as improved communication skills or improvement in work ethic of employees.

Frequent evaluation of first-line supervisors during and following preparation to be a problem-solver serves a dual purpose, improvement of the preparation program as well as improvement in the knowledge base of the first-line supervisor. As stated by Chevalier (2007): "Evaluation not only measures the impact of training but also encourages participants to use what was learned because it focuses attention on that training" (p. 159). Because an effective preparation program for first-line supervisors to be performance problem-solvers should include coaching, frequent evaluation provides a basis for coaching of the individual first-line supervisor as a problem-solver. When using action research methodology to solve problems, each first-line supervisor will employ evaluation as an integral part of the methodology.

Implication 2: Training of Participants

Just as performance is not based upon behavior of an individual, but rather the accomplishment of an individual (Gilbert, 1978), so should training to become performance problem-solvers be based upon accomplishment. Training and coaching in performance improvement principles should be appropriate for the trainee and provide the basic knowledge that the trainee needs to develop skills as a problem-solver. Each trainee enters any training with different knowledge and skills than any other trainee and the training should reflect this difference. Kirkpatrick (2005) queried a group of international experts on what factors in training would facilitate transfer of training to behavior on the job. The best practices in

answering the query that were germane to training of first-line supervisors as problem-solvers were:

- "Include modeling and practice
- Make sure people get a chance to use immediately what they have learned
- Share the rational for changes and new behaviors…
- Split courses into smaller parts to allow time for on-the-job application
- Share the benefits of new expectations…
- Use group implementation to create mutual support
- Offer merit rewards" (p. 74).

All of these recommendations were used in the training conducted for the first-line supervisors and managers of Light Manufacturing Company (pseudonym) prior to the commencement of this research study.

In the application of these best practices for training, the following factors served as central themes to encourage transfer of learning to the job.

Frequent Use of Exercises in Class. Participatory exercises were used in each training session to demonstrate the specific training subject as well as providing opportunities for interaction between the trainees. All exercise were specifically intended to support and extend the principles covered in each training session to specific use by the trainees in the facility. Exercises also permitted trainees to apply knowledge gained, with results of the exercises linked to the Light Manufacturing Company (pseudonym).

Location and Arrangement of Training Room. The training room was located near the production area of the facility and seats were arranged in a U-shape to facilitate interaction of the trainer and the trainees as well as between trainees.

Training Class Size: While not specifically addressed in the suggestions of Kirkpatrick, the Trainer considered the class size of twelve to be ideal for the training. This class size permitted interaction of the trainees, with multiple viewpoints on any subject being addressed, yet also permitted the Trainer to easily interact with each trainee to re-enforce each principle presented.

Timing of Training. Training was conducted in short sessions of about one and one-half hours, allowing sufficient time to present and practice application of principles of performance improvement to aid trainees in retention of knowledge of the principles presented. Each trainee also participated in training outside of normal working hours, one day per week in the afternoon.

Support of Management. The Facility Manager was present at the first training session and emphasized to the attendees the importance of what they would learn in the training course. In addition, two managers also attended each training session along with the ten first-line supervisor trainees. Visible support by management of the training effort not only provides the opportunity for interaction of first-line supervisors with managers, but also emphasizes to the first-line supervisors the value that management, in general, places on the training.

Incentives for Participation. Each trainee received a certificate upon completion of the training course as well as verbal acknowledgement at employee meetings that the first-line supervisor had voluntarily attended the training on their own time, after normal working hours.

Implication 3: Coaching of Participants

Coaching of participating First-Line Supervisors began with the initial interview before commencing action research cycles by each and throughout the research study, concluding with the final interview with each First-Line Supervisor on closure of the research study. Bacon and Spear (2003) emphasized the importance of starting coaching at the beginning of the assistance

process and the importance of getting to know the person being coached very well, providing the opportunity to adapt the coaching to the person being coached. Three additional aspects of coaching were, and should be, elements in the coaching of first-line supervisors: (a) building trust between the coach and the person being coached, (b) establishing ground rules so that both coach and person being coached know what is expected of the other, and (c) practicing the skills the first-line supervisor must master to be an effective problem-solver. The action research methodology, including the frequent evaluation performed by a problem-solver, facilitate building an effective relationship between the coach and the first-line supervisor.

Implication 4: Job Aid Development and Use

The job aid used in this research study, the Performance Problem Tool, was intended to support the participating First-Line Supervisors in performance problem solving. Van Tiem, Moseley, and Dessinger (2012) labeled job aids as "performance support tools" and defined them to "provide just-in-time, on-the-job learning and just-enough information to enable a worker to perform a task efficiently and successfully without special training or reliance on memory" (p. 282). While this definition applies to workers, it also applies to the First-Line Supervisors who solve performance problems. An initial version of the Performance Problem Tool, the job aid for problem-solvers, was adapted during the research study to fit the needs of the First-Line Supervisors in the specific Light Manufacturing Company (pseudonym) facility. The Performance Problem Tool, as modified by the participating First-Line Supervisors through use, could be considered a successful performance tool by the measure established by Van Tiem, Moseley, and Dessinger (2012): "Those that guide job performance, reduce the length of time recall is necessary, signal when to take some action, and give directions or actions are successful performance support tools" (p. 282).

Three specific actions made the Performance Problem Tool, and any job aid, a successful job aid: (a) making the job aid specific to the organization and location, rather than being general in nature, (b) inviting feedback for users to improve the job aid, and (c) improving the job aid by actual use, rather than by pre-conceived views or assumptions.

Implication 5: Use of Action Research

Action research is far more than a research methodology, but also is a problem-solving methodology. Van Tiem, Moseley, and Dessinger (2012) stated: "Action learning is both a process and a program that builds opportunities for learning around real problems and work-related issues brought to the workplace by people" (p. 263). During this research study, the participating First-Line Supervisors solved problems, and were in the process of solving problems as the end of the study, actually encountered at Light Manufacturing Company (pseudonym) and used action research methods in improving performance.

Stringer (2014) maintained that a basic action research routine of "look, think, act", when repeated, can lead to solution of some problems encountered in a manner that is both easy to comprehend as well as to easy to apply. As revealed by participating First-Line Supervisors and observed by the Researcher, this simplistic approach supported the assertion of Stringer. As First-Line Supervisor 2 commented: "It not only give me a pattern to follow to solve problems, but also made me spend more time doing each of the three." The progress of each participating First-Line Supervisor in using the simplified action research methodology was observed by the Researcher in the following ways:

"Look": During the research study, each of the First-Line Supervisors progressed from pre-conceived attitudes with regard to the cause of a particular performance problem to asking

questions and listening in order to gain the information needed to perform a front-end analysis of each problem

"Think": Each First-Line Supervisor developed their skills in analyzing performance, selecting an intervention to improve performance, and evaluating both the analysis and selection processes

"Act": Each First-Line Supervisor became efficient at implementing solutions to performance problem and evaluating the results of the interventions.

Recommendations for Further Research

A review of the literature associated with supervision and forty years of personal experience consulting in industry, reveal a common problem of organizations: the lack of initial assistance, or inadequate assistance, in the preparation of first-line supervisors to become performance problem-solvers, to help workers close the gap between existing performance and desired performance. Few organizations have been found to have formal programs to aid new or potential first-line supervisors to become effective first-line supervisors in any way, with none of those few organizations being commercial entities. Yet helping first-line supervisors become effective as performance problem-solvers should be a part of the profit motive of very many businesses.

Further research into the use of first-line supervisors as performance problem-solvers could extend and enhance the results obtained in this research study. Some areas that might be explored in future research are (a) extending the length of the research study to a longer time period, (b) inclusion of a larger and more diverse sample of both first-line supervisors and other managers in research, (c) developing trainers and coaches from within the business specifically to aid first-line supervisors to become effective performance problem-solvers, (d) using different

research approaches to investigate problem-solving by first-line supervisors, and (e) developing business culture that supports and promotes preparation of first-line supervisors to be performance problem-solvers. "Successful implementation of performance interventions also depends on strong stakeholder support, carefully appointed team members, good decision making, and determined change-management leadership…" (Van Tiem etal, p. 198)

Lengthening the Research Time Period

The length of this research study, three months, permitted both formative and summative evaluation of the action research, the time period was not long enough for complete confirmative or complete meta evaluation. Depending upon the nature of the problem being solved, six months to one year of action would not only permit more complete evaluation of individual problems but also permit participating first-line supervisors to have more practice in solving performance problems and further enhance the skills of the participants. A longer study could also have the effect of demonstrating to stakeholders the value of implementation of a wider performance problem-solving intervention with first-line supervisors.

Were the length of the study increased, "the real measures of quantity, quality, time, cost and waste, not sufficiently measured "before and after the intervention, perhaps with control groups" could yield more data for use by management quantify the results. "These could most likely be reconstructed using archival data to track change during the intervention and then after the researcher has left to see if the changes were long lasting" (R. Chevalier, personal communication, November 9, 2014).

Sample Size and Demographics

This research study was conducted with a relatively small sample of six first-line supervisors and two managers who volunteered to participate for a work-force of less than 400

employees. In addition, the sample was taken from a small community with Light Manufacturing Company (pseudonym) being the major employer in the community. Future research should be conducted in larger communities with a larger population from which to obtain a sample and within larger business organizations. While the sample in this research study included both experienced and in-experienced first-line supervisors, a larger sample would permit study of a larger number of first-line supervisors with a cross-section of experience.

Using other Research Methodologies

While this research utilized a qualitative approach using action research, conducting quantitative studies or, perhaps, mixed methods approaches to extend this research might be used. For example, a quantitative study of the impact of performance improvement on reducing waste, decreasing lost-time accidents, increasing quality, or job enrichment of workers could extend the results of this study to a longer time period, with more quantifiable results.

Development of Performance Problem-Solving Trainers and Coaches

Research could be performed to determine how to organize a team within a business to train, coach, and evaluate first-line supervisors in performance problem-solving. In organizing such a team, the qualifications of team members as well as the manner in which the team will recruit, prepare, and evaluate first-line supervisors as problem-solvers should be included.

Development of a Business Support Structure for Performance Problem-Solving

In addition to research into how to set up and develop a team to help prepare first-line supervisors as problem-solvers, research into development of a support structure within the business to aid the team in supporting efforts in problem-solving should be performed. The importance of the amount of support given by management to first-line supervisors in solving performance problems cannot be overemphasized and is critical to the transfer of performance

improvements principles knowledge to problem-solving. As stated by Chevalier: "My experience with evaluating sales training is that 50% of all sales training wouldn't be necessary if the sales managers did their jobs. What if the managers and the work environment they create are part of the problem?" (Chevalier, R., personal communication, September 24, 2012).

As a part of further research, an effort could be made to develop more "hard data" on the results of a program for improving performance problem-solving. Such research, evaluating the results in terms of quantity, time, cost, waste, and other data that could be tracked after the initial development. This evaluation would give greater insight into the long term effect on the participating supervisors and the value to the organization of such supervisory development.

Conclusion

Do first-line supervisors improve worker performance using the basic principles of performance improvement and the job aid? The answer to this question, based upon the results of this research, is yes. *How do first-line supervisors implement training and coaching in the basic principles of performance improvement in order to solve worker performance problems?* The answer to this question, based upon the results of this research, is that first-line supervisors can utilize action research to learn and apply the principles of performance improvement very effectively.

The unique position of the first-line supervisor in any organization was identified by numerous organizational experts, including P. Drucker: "No job is going to change more in the next decade than that of the first-line supervisor in both factory and office. And few people in the work force are less prepared for the changes …" (Drucker, 1983, p. 2) Preparing first-line supervisors, especially in the area of performance improvement, can not only provide enhanced capability to meet organizational goals but also to improve the effectiveness of the first-line

supervisor as a problem-solver. Preparing first-line supervisors by training, coaching, and practicing application of both training and coaching enhance the ability of the individual to solve worker performance problems by focusing on accomplishment rather than behavior, a central precept of Gilbert.

The simplified approach to action research advocated by Stringer of "look, think, act" also describes the essence of solving problems, whether the actual cause of the problems originated from the worker or from the workplace. Understanding how to "look" includes knowledge of how to observe, how to ask questions, and how to listen to answers from those queried. Understanding how to "think" includes not only basic deductive reasoning ability acquired as a part of participation in a workforce, but also inductive reasoning flowing from use of a framework such as that inspired by an understanding of the Behavior Engineering Model and the Performance Improvement/Human Performance Technology Model, integral parts of performance improvement. Understanding how to select, apply, and maintain the intervention to improve performance provide a pathway to "act" for the first-line supervisor.

Practicing "looking" permits first-line supervisors to improve their ability to gather information needed for problem-solving efficiently as well as thoroughly, and, in addition, to hone their skills at communication with other members of the organization. Practicing "thinking" enhances the ability of first-line supervisors to analyze performance of workers, choose interventions that improve performance, and analyze the results of the interventions. Practicing "acting" to improve performance, in addition to improving the confidence of first-line supervisors as problem solvers, also increases the productivity of the organization, a central goal of all organizations. Practice also increases the ability of the first-line supervisor to evaluate all parts of the "look, think, act" process.

The value of a job aid, such as the Performance Problem Tool used in this research, is that the job aid provides a framework to guide the first-line supervisor through all phases of performance problem-solving. An additional value of the job aid proved to be, in this research, an inherent evaluation process, covering all phases of performance improvement.

The value to an organization of preparing first-line supervisors far exceeds the cost of preparation to the organization. The unique position of the first-line supervisor, directly between the worker who accomplishes and the manager who depends upon that accomplishment for organizational success, provides management with an equally unique opportunity to improve performance. In order for the manager to realize the rewards of performance improvement that the first-line supervisor is in a position to provide, an investment is required – the investment of preparing the first-line supervisor to be a performance problem-solver. As Rossett and Volki (2000) stated in referring to task analysis: "Abraham Lincoln… said, 'If I had eight hours to chop down a tree, I'd spend six sharpening my ax'" (p. 30). With regard to improving performance through first-line supervisors, the best way to begin is by "sharpening the ax."

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APPENDIX A, PERFORMANCE PROBLEM TOOL

(Note: Performance Problem Tool Developed by Researcher)

Prior to Counseling Session with Worker: Date: _____ Supervisor: _____ Worker: _____

Problem Observed: _____

Which of the following organizational goals are applicable? (Check all that apply.)

___ Vision ___ Mission ___ Values ____ Goals ___ Strategy

What is the desired performance of this Individual? _____

How is performance measured? _____

Which of the following Environmental factors affect the observed performance? (Check all that apply.)

___ Culture ___ Society ___ Social Responsibility ___ Economy ___ Other: _____

___ Workplace Organization ___ Resources Available ___ Tools Available ___ Supervision ___ Co-Workers

___ Work Schedule ___ Workplace Conditions ___ Work Procedures ___ Responsibilities ___ Workplace Ergonomics

___ Worker Knowledge ___ Worker Skill ___ Worker Capacity ___ Worker Motivation ___ Worker Expectations

What is the actual performance of this Individual? _____

Estimated gap between desired performance and actual performance? _____

Estimated Readiness Level of Worker to Improve Performance (Select one below):

___ R1 (Unable and unwilling or insecure)
___ R2 (Unable, but willing or confident)
___ R3 (Able, but unwilling or insecure)
___ R4 (Able, willing, and confident)

During Counseling: Using the Cause Analysis Worksheet on the back of this sheet, estimate the cause of the performance problem:

Based upon your knowledge, what is the recommended solution to improving performance for this worker?

What barriers do you anticipate to helping this worker improve performance?

How will you measure how performance improved?

Follow-up, Subsequent to Counseling: Did performance improve and how did you measure the improvement?

Revised estimate of Readiness Level: ___ R1 ___ R2 ___ R3 ___ R4 Date of Estimate: _____

Revised estimate of Readiness Level: ___ R1 ___ R2 ___ R3 ___ R4 Date of Estimate: _____ (If applicable.)

Revised estimate of Readiness Level: ___ R1 ___ R2 ___ R3 ___ R4 Date of Estimate: _____ (If applicable.)

	Group	Subgroup	Decision
Environment	Information	Role	Roles and performance expectations are clearly defined.
		Feedback	Employees are given relevant and frequent feedback about the adequacy of performance.
		Guides	Work processes are described in guides clearly and in a relevant manner.
		PMS	The performance management system guides employee performance and development.
	Resources	Tools	Materials, tools, and time needed to do the job are present.
		Procedures	Processes and procedures are clearly defined and enhance individual performance if followed.
		Worksite	Overall physical and psychological work environment contributes to improved performance.
		Safety	Work conditions are safe, clean, organized, and conducive to performance.
	Incentives	Rewards	Financial/non-financial incentives present; measurement and reward systems reinforce positive performance.
		Fulfillment	Jobs are structured to allow for fulfillment of employee needs.
		Positive	Overall work environment is positive, where employees believe they have an opportunity to succeed.
		Career	Career development opportunities are present.
Individual	Knowledge/ Skills	Knowledgeable	Employee has necessary knowledge, experience, and skills to do the desired behaviors.
		Placement	Employees with necessary knowledge, experience, skills properly placed to use and share what they know.
		Cross-Training	Employees are cross-trained to understand each other's roles.
	Capacity	Capable	Employee has the capacity to learn and do what is needed to perform successfully.
		Suited	Employee is suited through recruitment and selection to match the realities of the work situation.
		Emotionally-Fit	No emotional limitations exist that would interfere with performance.
	Motives	Motive	Motives of employee are aligned with the work and the work environment.
		Desire	Employee desires to perform the required job.
		Match	Employee was recruited and selected to match the realities of the work situation.

APPENDIX B. LOW LEVELS OF TRANSFER OF TRAINING TO DESIRED PERFORMANCE

Researcher(s), Date	Focus of Research	Summary of Findings
Fleishman, Harris, & Burtt (1955)	Loss of desired behavior change following training	Study of International Harvester foremen, trained in leadership principles and techniques. Following training, most foremen exhibited desired behavior. After several months, most had reverted to original behavior. The few who continued to demonstrate behaviors worked for supervisors who also demonstrated the desired behaviors.
Mosel (1957)	Minimal impact of training	Training often "makes little or no difference in job behavior."
Newstrom (1985)	Decrease in training content applied over time following training; barriers to transfer of learning to performance	Study of perceptions of learning specialists (members of ASTD). On average, they perceived: (1) Only 40 percent of training content was applied to job immediately following training, (2) Only 25 percent of content still applied to job after six months, (3) Only 15 percent of content still applied to job after one year, (4) Lack of reinforcement by supervisors on the job, (5) Difficulties in the work environment, (6) Non-supportive climate in the organization, (7) Learner perception of new skills as impractical, (8) Learner discomfort with change, (9) Separation from instructional provider, (10) Poor design and delivery of training program, and (11) Negative response to new behaviors by co-workers.
Baldwin and Ford (1988)	Survey of literature and research on transfer of training	Among other findings: Not more than 10 percent of the estimated $100 billion spent each year on training by American industry actually resulted in transfer to the job.
Kotter (1988)	Factors inhibiting success of management training	In a survey of top executives, more than half identified two factors that inhibited the success of training to improve performance of managers: (1) lack of involvement by top managers in the change development process (71 percent of respondents), and (2) new improvement efforts centralized at top echelons of the organization but not accepted by lower-level participants (51 percent of respondents).
Tannenbaum & Yukl (1992	Low levels of transfer of learning	In a review of the literature: transfer of learning to job performance was generally significantly lower than desired, with relatively few learners (as low as 5 percent) affirming that they had applied what they had learned to their job performance.
Stolovitch (2000)	Low transfer rates for training as sole intervention	In a study of best practices: Training alone is usually not effective in achieving on-job application. Low transfer rates for training alone range from 10 to 30 percent "with most on the low end."

APPENDIX C. DROP-OUT SUPERVISOR INTERVIEW QUESTIONS

Why did you decide to end participation in this project?

In your opinion, what was "missing" from the project?

From Light Manufacturing Company (LMC)?

From Light Manufacturing Company management?

From the Researcher?

From the Research Project?

From You?

What could be changed to improve each of the following?

Training:

Coaching:

Job Aid:

Researcher Actions:

How did you change as a result of your participation to this point?

How do you feel that you can best be helped to become a better problem-solver?

APPENDIX D. INTERVIEW QUESTIONS – MANAGERS

Interview Questions: Manager (Initial)

Caution: Prior to beginning this interview, the following conditions must be met:

- Manager acknowledges that participation in the research is voluntary.
- Manager acknowledges that participation may be terminated at any time.
- Manager has read, understands, and signs the Informed Consent Form for Managers.
- Manager has a copy of the Performance Improvement training outline

Interview Questions:

1. Now that you are familiar with the Performance Improvement / HPT Model:
    a. How would you change the initial evaluation parameters?
    b. What additional evaluation parameters do you feel need to be added?
2. With regard to performance improvement, how are supervisors prepared to assume the position of supervisor at the Light Manufacturing Company?
    a. What classroom training does each supervisor receive?
    b. What on-the-job training does each supervisor receive?
    c. If they are trained, what is the content of that training?
    d. How, in your opinion, should a new supervisor be prepared to assume their job?
3. What skills do you feel make a supervisor an exemplary supervisor as a performance problem-solver?
4. With regard to worker performance problems:
    a. What types of problems do you feel are encountered by supervisors?
    b. What do you feel are the skills a supervisor needs to help workers improve performance?
    c. What do you feel your role is in helping supervisors improve performance?
5. What benefits will flow to this facility, in particular, from improving worker performance?
6. What benefits will flow to your company from improving worker performance?

7. What feedback would you like from me as the research proceeds?

Interview Questions: Manager (Periodic)

Caution: Prior to beginning this interview, the following conditions must be met:

- Manager acknowledges that participation in the research is voluntary.
- Manager acknowledges that participation may be terminated at any time.
- Manager has signed the Informed Consent Form for Managers.

Interview Questions:

1. Has this performance improvement research benefitted this company thus far?
    a. If so, how?
    b. If not, why do you think that it has not?
2. With regard to performance problem-solving skills of supervisors, have you observed any changes in participating supervisors up until now in this research?
    a. If the changes were positive, how would you describe them?
    b. If you have not observed any change in participating supervisors up until now, what do you feel is the reason for that?
3. In what ways do you believe that you have helped participating supervisors improve their performance problem solving skills?
4. In what ways do you believe that you can help supervisors as performance problem-solvers?

APPENDIX E. INTERVIEW QUESTIONS – SUPERVISORS

Interview Questions: Supervisor (Initial)

Caution: Prior to beginning this interview, the following conditions must be met:

- Supervisor acknowledges that participation in the research is voluntary.
- Supervisor acknowledges that participation may be terminated at any time.
- Supervisor has read, understands, and signs the Informed Consent Form for Supervisors.

Interview Questions:

1. Now that you are familiar with the Performance Improvement / HPT Model:
    a. How would you change the initial evaluation parameters for yourself as a performance problem-solver?
    b. What additional parameters would you add to evaluate your own performance as a performance problem-solver?
2. With regard to performance improvement, how were you prepared to assume the position of supervisor?
    a. What classroom training to be a supervisor did you receive?
    b. What on-the-job training to be a supervisor did you receive?
    c. What training would you have liked to receive when you started?
    d. How, in your opinion, should a new supervisor be prepared to assume their job?
3. What skills do you feel make a supervisor an exemplary supervisor as a performance problem-solver?
4. What do you feel are the skills a supervisor needs to help workers improve performance?
5. What do you feel your role is in helping improve performance?
6. What benefits will flow this facility, in particular, from improving worker performance?
7. What benefits will flow to this company from improving worker performance?
8. What types of performance problems of workers have you encountered before now?
9. If you have encountered worker performance problems:
    a. How have you handled the performance problems that you have encountered?
    b. What barriers do you feel have kept you from solving them?

c. What would have helped you in solving these problems?

10. What feedback would you like from me as the research proceeds?
11. At this time, how would you evaluate your own skills as a performance problem-solver?

APPENDIX F. EVALUATION WORKSHEET – PERFORMANCE IMPROVEMENT ACTION RESEARCH CYCLES

Date: _____Supervisor: _____

Check the type of evaluation: __ Formative __ Summative __ Confirmative __Meta

Formative Evaluation Guidelines (before action research cycle starts):

Current capacity of supervisor as a problem-solver:

Desired capacity of supervisor as a problem-solver:

Planned action over this action research cycle to reach desired capacity:

Summative Evaluation Guidelines (initially, during action research cycle):

Does the capacity of supervisor as a problem-solve start to change? How?

If capacity starts to change, what is the attitude of the supervisor toward the change?

Is further change required immediately, before the end of this action research cycle?

What is estimated effect of the immediate change in capacity on Managers? Workers?

Confirmative Evaluation Guidelines (at completion of the action research cycle):

Current capacity of supervisor as a problem-solver:

Was the desired capacity goal met?

Why was it NOT met? Or Why WAS it met?

What changes need to be made by the supervisor?

How many performance problems were solved?

What kinds of problems WERE solved?

What kinds of problems WERE NOT solved?

Meta Evaluation Guidelines (at completion of the action research cycle):

What were the barriers to problem-solving?

What was conducive to problem-solving?

What knowledge gap does the supervisor need to fill?

Is this action research process working for the supervisor?

If so, why?

If not, why not?

What changes need to be made to the process?

What is the feedback from workers?

What is the feedback from managers?

APPENDIX G. EVALUATION WORKSHEET – JOB AID ACTION RESEARCH CYCLES

Formative Evaluation Guidelines (before action research cycle starts): Date: _____

Capacity of the job aid to help supervisors solve problems, in the view of the supervisors:

What should be added to the job aid prior to use?

What should be removed from the job aid prior to use?

Date revised job aid was provided to all supervisors: _____

Summative Evaluation Guidelines (initially, during cycle): Date: _____

In the opinion of the supervisors, is the job aid initially useful on the job?

If not, why not?

Is change in the job aid necessary before the action research cycle is complete?

If change is necessary, date change was made and distributed to supervisors: _____

Confirmative Evaluation Guidelines (at completion of action research cycle): Date: _____

Current capacity of the job aid to help supervisors solve problems:

Supervisors: What changes need to be made?

Why?

Researcher: What changes need to be made?

Why?

How many performance problems were solved using the job aid?

What kinds of problems WERE solved using the job aid?

What kinds of problems WERE NOT solved using the job aid?

Meta Evaluation Guidelines (at completion of action research cycle): Date: _____

What were the barriers to using the job aid?

What was conducive to using the job aid?

Is this action research process working for development of the job aid?

If so, why?

If not, why not?

What changes need to be made to the process of improving the job aid?

Is the job aid in its current form being utilized effectively?

If not, what is wrong with the content of the job aid?

APPENDIX O. LEADERSHIP TRAINING OUTLINE

Session	Content	Exercises
1	What is the Role of a Leader?	Toothpaste Problem (emphasis: problem-solving) Good/Bad Leaders
2	Leadership Principles	Leadership Values Leadership Style
3	Leadership Environment: Global Environment (Culture, Society, Technology) Organizational Environment (Vision, Mission, Goals, Stakeholders, Competition)	Are You a Millennial? (emphasis: differing societal mores) People and Organizations (emphasis: organization goals) Organizational Concepts (emphasis: organization structure)
4	Leadership Environment: Workplace (Resources, Tools, Job Aids) Work (Workflow, Procedures, Responsibilities, Ergonomics) Workers (Knowledge, Skills, Capacity, Motivation, Expectations)	Survival Exercise (emphasizing teamwork)
5	Personal Leadership Skills: Listening Skills Talking Skills Coaching Skills	Listening Asking Questions
6	Improving Performance Through Leadership: Gilbert (Three Leisurely Theorems, BEM) Readiness Level	Using Readiness Level
7	Basic Principles – PI/HPT Model:	Using PI/HPT Model:

	Performance Analysis Performance Gap Interventions – Designing, Implementing Evaluation Leadership Style	Meetings Problem Tools Problem Dynamite Factory Problem
8	Public Speaking Principles	Examples: Common Mistakes
9	Public Speaking Practice	Individual Presentations

PI/HPT – Performance Improvement/Human Performance Technology

Developed by author

APPENDIX P. REVISED PERFORMANCE PROBLEM TOOL

Date: _____ First-Line Supervisor: _____ (Circle One) Initial / Follow-up
Problem Observed: _____

Assumed Cause of Problem: ___Equipment __Personnel ___Other: _____
If "Equipment" or "Other", action taken: _____
If "Personnel", what is the desired performance? _____
(Use the Environmental Factors Worksheet, on the back of this sheet) as necessary to
How is performance measured? _____
What is the actual performance? _____
Estimated Readiness Level of Personnel to Improve Performance (Select one below):

___ R1 (Unable and unwilling or insecure)
___ R2 (Unable, but willing or confident)
___ R3 (Able, but unwilling or insecure)
___ R4 (Able, willing, and confident)

Using the Cause Analysis Worksheet (back of this sheet), estimate the cause of the performance problem:

_____

Action necessary to improve performance: _____

Action taken: _____

Follow-up: Result of action taken: _____

If action DID solve problem, describe resulting performance: _____

Estimated impact of action taken: _____

If action DID NOT solve problem, recommended course of action: _____

Comments:

Environmental Factors Worksheet:

Which of the following Environmental factors affect the observed performance? (Check all that apply.)

___ Culture ___ Society ___ Social Responsibility ___ Economy ___ Other: _____

___ Workplace Organization ___ Resources Available ___ Tools Available ___ Supervision ___ Co-Workers

___ Work Schedule ___ Workplace Conditions ___ Work Procedures ___ Responsibilities ___ Workplace Ergonomics

___ Worker Knowledge ___ Worker Skill ___ Worker Capacity ___ Worker Motivation ___ Worker Expectations

Cause Analysis Worksheet:

	Group	Subgroup	Decision
Environment	Information	Role	Roles and performance expectations are clearly defined.
		Feedback	Employees are given relevant and frequent feedback about the adequacy of performance.
		Guides	Work processes are described in guides clearly and in a relevant manner.
		PMS	The performance management system guides employee performance and development.
	Resources	Tools	Materials, tools, and time needed to do the job are present.
		Procedures	Processes and procedures are clearly defined and enhance individual performance if followed.
		Worksite	Overall physical and psychological work environment contributes to improved performance.
		Safety	Work conditions are safe, clean, organized, and conducive to performance.
	Incentives	Rewards	Financial/non-financial incentives present; measurement and reward systems reinforce positive performance.
		Fulfillment	Jobs are structured to allow for fulfillment of employee needs.
		Positive	Overall work environment is positive, where employees believe they have an opportunity to succeed.
		Career	Career development opportunities are present.
Individual	Knowledge/ Skills	Knowledgeable	Employee has necessary knowledge, experience, and skills to do the desired behaviors.
		Placement	Employees with necessary knowledge, experience, skills properly placed to use and share what they know.
		Cross-Training	Employees are cross-trained to understand each other's roles.
	Capacity	Capable	Employee has the capacity to learn and do what is needed to perform successfully.
		Suited	Employee is suited through recruitment and selection to match the realities of the work situation.
		Emotionally-Fit	No emotional limitations exist that would interfere with performance.
	Motives	Motive	Motives of employee are aligned with the work and the work environment.

		Desire	Employee desires to perform the required job.
		Match	Employee was recruited and selected to match the realities of the work situation.