The Field Study of a Training Transfer Enhancement Process and its Effect on Transfer of Training

Andrew W. Bowne
Western Michigan University

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THE FIELD STUDY OF A TRAINING TRANSFER ENHANCEMENT PROCESS AND ITS EFFECT ON TRANSFER OF TRAINING

by

Andrew W. Bowne

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THE FIELD STUDY OF A TRAINING TRANSFER ENHANCEMENT PROCESS AND ITS EFFECT ON TRANSFER OF TRAINING

Andrew W. Bowne, Ed.D.
Western Michigan University, 1999

Transfer of training is defined as the degree to which trainees apply, in their jobs, the knowledge, skills, and attitudes they gained in training. Research regarding transfer of training has called training effectiveness into question. For example, Baldwin and Ford (1988) reported average transfer rates typically in the 10% range.

The study tested the effectiveness of particular procedures and tools intended to enhance transfer of training. These transfer enhancing tools were employed by an experimental group of trainees' supervisors (who received training from the researcher in the application of the tools) before a half-day problem-solving training workshop for their employees commenced, and after their return from the training. The supervisor interventions were intended to increase the trainees' understanding of how the training was linked to company business goals, and also to help them focus their learning on specific post-training behaviors that would increase the business impact of the training. The experimental group of trainees themselves, during the training, also employed similar tools with a similar purpose.

The training was conducted in a West Michigan manufacturing company with about $200 million in sales and more than 800 employees. Data were collected from 62 trainees and their respective 21 supervisors using survey and interview methods before, during, and after the training.
The study concluded that the transfer enhancement tools and procedures did in fact lead to positive impact. The transfer enhancing interventions were associated with a positive increase in the transfer support climate. Further, the experimental group of trainees reported more usage of the training in specific job applications that had been targeted before the training as those applications most likely to lead to business impact.
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Andrew W. Bowne
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CHAPTER I

INTRODUCTION

Statement of the Problem

In 1997, organizations employing more than 100 people were estimated to have spent more than $58.6 billion on direct formal training costs according to a study produced by Lakewood Research (1997). Dean, Dean, and Rebalsky (1996) estimated that in 1994, U.S. companies would spend $50.6 billion, a 5% increase over the amount spent in 1993. Training is big business in the United States and continues to grow each year.

During a 1990 Training & Development Journal interview, David Kearns, CEO of Xerox, claimed that the corporation spends 2.5–3.0% of its revenue on training each year (Galagan, 1990). Kearns also reported that an additional $125 million was spent on quality training alone. This is a tremendous investment in employees, which is intended to result in higher productivity, improved quality, etc., due to the increase of employee knowledge and skill levels.

Following an extensive review of the transfer-related research, Baldwin and Ford (1988) state that the research consistently shows that there is only a 10% transfer of what was learned, back to the work environment. For the purposes of this study, transfer of training is defined as the degree to which trainees consistently and effectively apply, in their jobs, the knowledge, skills, and attitudes they gained in
training. This definition is slightly modified from the original definition by Holton, Bates, Seyler, and Carvalho (1997b).

One result of the limited transfer rate is that senior managers in businesses are beginning to question the value of training. King (1996) proposes that as gaining a competitive edge becomes increasingly difficult and as employers spend greater and greater amounts of money and time on training, management is beginning to question how well training is working. Kelly (1982) makes the claim that training that doesn't transfer is a waste of time and money and is a blow to an already sagging training and development reputation.

Purpose of the Study

A commonly asked question regarding transfer of training is, “What can be done to ensure that what is learned in training will be retained and transferred to the job?” (Wexley & Latham, 1991, p. 96). Can a practical, researched-based training transfer enhancement process be used to assist the transfer process? This question is the focus of the study. Baldwin and Ford (1988) in a comprehensive review of the transfer literature, suggested that more efforts at transfer-enhancing model development are needed. Stata (1989) pointed out the need for research geared toward messy, real-life management issues. The purpose of this study is to field test an application-oriented, research-based, training transfer enhancement process in a manufacturing environment. The transfer enhancement process is operationalized through the use of a series of prescribed methods and written tools.
Importance of the Study

For almost 100 years, scholars and practitioners have been studying the issue of transfer of learning with limited success (e.g., Thorndike, 1901, cited in Baldwin & Ford, 1988). This observation is made based on the fact that researchers like Baldwin and Ford (1988) are still dealing with the transfer-related issues of training inputs (training design, trainee characteristics, and work environment), training outputs (learning and retention), and conditions of transfer (generalization and maintenance). Foxon (1997) found that while much corporate training is now better designed than ever, there remains a sense of unease about the level of transfer.

Based on relatively recent work, it appears that the transfer puzzle has not been solved. Broad and Newstrom (1992), in their popular book on transfer of training, supported the general understanding of scholarly literature and research by stating that, typically, not more than 10% of what was learned in training transfers back to the workplace resulting in new or enhanced work behaviors. Very few business people would make an investment if they knew that the return on their investment would be approximately only 10%.

Findings from the present study could be useful in a variety of ways. If the training transfer enhancement process is shown to have some promising impact on the transfer of learning, then similar methods and tools might become commonly incorporated into a larger number of training programs. With the kind of investment employers are making in training, employers are looking for simple, easy-to-use tools that have an impact on the bottom line.
Definitions of Key Terms

Several key terms are critical to this study. Therefore, these terms need clarification as they relate to the study. Training is defined as learning that is provided in order to improve performance in the present job. A trainee is an employee who participated in, and completed, the prescribed training course. Supervisors are the people to whom trainees report and are the employer's first level of management. Transfer of training is defined as the degree to which trainees consistently and effectively apply in their jobs what they learned in training. Transfer climate is defined as perceptions of situations and consequences in the workplace which inhibit or help to facilitate transfer of training.

Overview of the Study

The study involved the development and testing of a research-based transfer enhancement process. This process consisted of a set of practical tools for use before, during, and after training. The transfer enhancement tools included: an impact map, which linked training to job behaviors and organizational performance measures; a systems analysis worksheet, which identified driving and restraining forces related to using the new learning on the job; an action planning worksheet, which helped trainees plan for how new learning would be applied on the job; and a supervisory support worksheet, which was used to help supervisors support trainee transfer efforts. Data collection occurred before and after training through a series of surveys and interviews. The areas of data collection focused on transfer of training, transfer climate recognition, and transfer enhancement tool usage.
The following conceptual hypotheses were tested. First, transfer will be
greater among the trainees whose supervisors use the transfer enhancement process
than that of the group of trainees whose supervisors did not use the transfer
enhancement tools. Second, the level of transfer will be positively correlated with
reported improvements in the transfer environment. Finally, the more the supervisors
and the trainer use the transfer enhancement tools, the more the trainees will report a
positive transfer climate. A flowchart which outlines the logic of this study can be
found in Appendix A.

The study had limitations similar to those experienced by other field studies.
The controls were not as tight as in more clinical studies. For example, some of the
supervisors had trainees in the group that were involved with using the transfer
enhancement tools and the group that did not use the transfer enhancement tools.
Another potential limitation of the study is that the level of transfer was self-reported
by trainees.
CHAPTER II
CONTEXT OF THE STUDY

Transfer of training has received a great deal of attention, particularly in the management, human resource development, industrial/organizational psychology, and organization development professions, as well as in education popular and technical journals and publications. Georgenson (1982) claims that the problem of transfer is of critical concern, especially in a tight economy where payback on investments in employee development is essential. Katz and Bollettino (1981) believe that transfer problems exist anytime someone decides to train in an environment other than the job. Kelly (1982) reported that one Fortune 500 company states that the company was getting only a 10% transfer back to the job. Ungsrithong (1991), in her doctoral dissertation, points to the fact “that transfer of training has been recognized as a crucial mission for the training profession” (p. 11).

At the same time, the research being done in the area of transfer is adding value to the body of technical knowledge (e.g., Baldwin & Ford, 1988; Baldwin, Magiuka, & Loher, 1991; Broad & Newstrom, 1992; Ford, Quinones, Sego, & Sorra, 1992; Gist, Bavetta, & Stevens, 1990; Hicks & Klimoski, 1987; Huczynski & Lewis, 1980; Mathieu, Martineau, & Tannenbaum, 1993). Even with all the discussion of the topic and all the research that has been done and continues to be done, the problem of transfer of training still exists.

This chapter starts with a discussion of the link between training and performance and then explore a few definitions of transfer. From this background
information, barriers to the transfer of training are identified based on prior research. Barriers fall into two categories: individual and organizational. After the barriers to successful transfer are discussed, a brief review of various transfer theories and models will be presented. Finally, the best ideas from previous research will be pulled together to develop and justify a hybrid, "ideal" model for implementing specific transfer enhancing steps.

Training and Performance

Brinkerhoff (1987) lays out two criteria for effective training. First, training must produce learning changes with efficiency and efficacy; and, second, it must be worth doing. Worth is defined as the extent to which value is produced at a reasonable cost to the organization. In the book Human Competence, Gilbert's (1996) definition of worthy performance supports Brinkerhoff's second criterion for effective training, by stating that performance is worthy when the value of the accomplishment exceeds the cost of the behaviors.

Rummler and Brache (1990), in their popular research-based book, argue that no matter what the concern, whether it be quality, customer service, productivity, cycle times, or cost, the underlying issue is employee performance. Therefore, if performance is the issue, translating training into job behaviors and, more importantly, job accomplishments is critical.

According to Gilley and Coffern (1994), human resource development (HRD) efforts, including training, must be performance-centered. When training efforts are performance-centered, the focus is exclusively on improving employee performance and organizational effectiveness. Transfer of what was learned in training into on-the-job behaviors is intended to result in improved employee performance.
Transfer of Training

Gick and Holyoak (1987) define transfer of learning as a phenomenon involving change in the performance of a task as a result of the prior performance of a different task. This definition barely distinguishes between “transfer” and “learning.” Gick and Holyoak claim that many contemporary studies of transfer do not involve the intentional learning of a transfer task A'. Instead, the transfer is reflected in the performance of task A' on the basis of knowledge acquired by performing task A. Detterman (1993), in his case against transfer of training, defines it as the degree to which a behavior will be repeated in a different (new) situation. As transfer of learning theory has shifted to transfer of training theory, the definition switched to the application of learning in the work environment.

Georgensen (1982) defines transfer as the degree to which an individual uses the knowledge and skills learned in the classroom on the job in an effective and continuous manner. Baldwin and Ford (1988) define transfer to include the maintenance of learned material over time and the generalization of that learned material. Huczynski and Lewis (1980) quote Stiefel (1974) defining transfer as involving both the ability to apply what has been learned and the possibility of using it in the organizational situation.

Broad and Newstrom (1992), in their classic work on transfer of training, define transfer as the effective and continuing application, by trainees to their jobs, of the knowledge and skills gained in training (both on and off the job). Transfer may encompass both maintenance of behavior and its generalization to new application.

Not all definitions of transfer go as far as those of Broad and Newstrom or Stiefel. Gist, Bavetta, and Stevens (1991) refer to transfer as skill acquisition and
Royer (1979) defines transfer of learning as the extent to which the learning from an instructional event contributes to or detracts from future learning or problem solving. This definition is examined during Royer’s review of various transfer of learning theories, primarily environmental and cognitive theories. Wexley and Latham (1991) list three common definitions of transfer. Positive transfer occurs when learning in the training situation results in better performance on the job. Conversely, negative transfer occurs when learning in the training situation results in poorer performance on the job. And, finally, zero transfer occurs when learning in the training situation has no effect on job performance. Common among all of these definitions is the central and vexing issue that learning in a training context is intended to lead (transfer) to improved job performance.

Components of Effective Transfer of Training

What is known about effective training ties directly to what is known about positive transfer. In an extensive review of the transfer literature, Baldwin and Ford (1988) identified the key components for effective transfer and explored the studies which supported each component or theory. Baldwin and Ford listed the following five components of effective transfer: (1) training design, (2) trainee characteristics, (3) work environment, (4) training outcomes, and (5) conditions of transfer. Transfer of training is an extremely complex issue. While this study concentrates on the work environment, each component outlined above is necessary for positive transfer to occur.
**Training Design**

Concerning training design, Baldwin and Ford (1988) identified four principles which need to be considered: identical elements, general principles, stimulus variability, and conditions of practice.

The likelihood of training transfer can be enhanced through the use of identical elements. Broad and Newstrom (1992) suggest that transfer will be more likely to occur when the training design approximates or includes as many of the trainee's work facets and tasks as possible. When identical elements are part of the training design, the differences between the training environment and the work environment are minimized. The similarity between the two environments is believed to increase the likelihood of transfer. Leifer and Newstrom (1980) suggest that identical elements are particularly useful in motor skills or technical skill training, but less effective in conceptual or management skills. Royer (1979) defines this concept, identical elements, as near transfer. Identical elements and near transfer suggest a similarity between the learning environment and the work environment. The more similar the two, the more likely transfer will occur.

Baldwin and Ford (1988) found that trainees are more likely to learn in training programs where the information to be learned is presented using a variety of relevant training stimuli. Davis, Alexander, and Yelon (1974) support this concept with the similar notion that the trainer's style and means of presentation should be varied.

Rather than teaching just applicable skills, McGehee and Thayer (1961, cited in Baldwin & Ford, 1988), recommend that teaching should take place through general principles. Davis et al. (1974) define a principle as a relationship between
classes of events which allow trainees to (a) predict consequences, (b) explain events, (c) infer causes, (d) control situations, and (e) solve problems. The advantage of training by using general principles is that it facilitates the transfer and generalization of the new knowledge or skills by teaching these concepts that are believed to be applicable in a variety of settings. Leifer and Newstrom (1980) claim that the use of general principles is most appropriate for management skills training.

Davis et al. (1974) claim that trainees are more likely to learn if there is active practice geared toward the instructional objective. According to Davies (1981), two choices exist for practice. The first option is massed practice, which lumps large blocks of time for concentrated practice. The second option, distributed practice, involves shorter periods of practice spread out over time. Massed practice is believed to be more efficient, but distributed practice is more effective. Along with practice must be a combination of guidance and feedback.

Trainee Characteristics

Trainee characteristics such as ability, personality, and motivation play a role in transfer of training (Baldwin & Ford, 1988). Gilbert (1996) lists three characteristics which make up the individual's behavior repertory: knowledge, capacity, and motives. Research conducted by Mumford, Weeks, Harding, and Fleishman (1988) within the U.S. Air Force indicated that trainee characteristics such as intellectual, motivational, and adaptational constructs appeared to have an important influence on achievement during training. Hicks and Klimoski (1987) claim, based on research conducted around a management training program, that understanding the trainee's point of view prior to training is important in terms of attaining training outcomes. The characteristics identified by Gilbert, Mumford et al.,
and Hicks and Klimoski assist in defining each individual trainee. What a trainee knows, is individually capable of learning and applying, and desires influences the level of transfer.

Baldwin and Ford (1988) define two important personality variables as “locus of control” and “need for achievement.” Referring to the study of 240 Indian managers conducted by Baumgartel et al. (1984, cited in Baldwin & Ford, 1988), the authors state that managers having high needs for achievement and an internal locus of control are more likely to apply new SKAs (skills, knowledge, and attitudes) on the job. Internal locus of control can be defined as believing that events which occur in the workplace and performance are under the individual’s control (Noe, 1986).

Noe and Schmitt (1986) define motivation to learn as “a specific desire on the part of the trainee to learn the content of the training program” (p. 501). Similarly, in a study of trainee motivation and learning, Baldwin et al. (1991) found that trainees with a choice regarding training are more highly motivated than others. However, the level of learning between trainees who had a choice and trainees who did not have a choice was not significantly different. In a like manner, Cohen (1990), in a study of five organizations, 194 subjects, and 14 training programs, found general support for assumption that employees will be more motivated if their supervisors are supportive and if they perceive attendance as voluntary rather than mandatory.

In the current study, training design and trainee characteristics, though important to transfer, were not manipulated. Certain work environment issues were central to this study.
Work Environment

The work environment is a third critical piece to successful transfer of training (Baldwin & Ford, 1988). Mathieu, Tannenbaum, and Salas (1992) found in their study of 106 university employees that situational (or organizational) constraints had two negative consequences on the transfer of training. First, such constraints limit the extent to which trainees can transfer newly acquired SKAs to the job. And, second, anticipating these constraints stifles the learning process.

Describing the concept as environmental favorability, Noe (1986) described two sets of work environment concerns. First, are the tools, equipment, materials, supplies, and monetary support required to apply the new SKAs available? Second, is there adequate support from peers and supervisors? Deficiencies in either of these two areas will restrict the likelihood of transfer. Bellanca (1995) states that successful transfer is enabled by the organization’s readiness to accept and promote learning transfer. If the culture is hostile or indifferent to the learning and transfer, even the most determined person will become frustrated and overwhelmed and transfer will be diminished. Similarly, Montesino (1995), in a study of the alignment of training to the strategic direction within a Fortune 200 company, found that a conscious effort should be made to demonstrate the connection between individual training programs and an organization’s strategic direction.

Ford and Weissbein (1997) reported that advancements had been made to increase the understanding of work environment constructs and linking the work environment to transfer outcomes. More progress could still be made in developing strategies to actively intervene in changing work environmental factors and examining their impact on learning and transfer.
Training Outcomes: Learning and Retention

According to Michalak (1981), successful training involves two phases: knowledge or skill acquisition and the maintenance of behavior once on the job. Similarly, Kirkpatrick (1967) defines learning as knowledge or skill acquisition. Furthermore, Baldwin and Ford (1988), based on an extensive literature review, make the basic point that skills must be learned and retained prior to being transferred to the work environment. In addition, how effectively the SKAs can be transferred is dependent upon the relationship between trainee characteristics, training design, and the work environment.

That which is learned must be retained or the transfer process ends. Broad and Newstrom (1992) list a variety of recommended activities that will assist in SKA (skill, knowledge, and attitude) retention. Opportunities for additional practice and feedback can be provided by the manager. The trainer can provide, with the support of the manager, follow-up refreshers and problem-solving sessions. The trainee can review the training content, maintain contact with others who completed the training program, and practice self-management.

Conditions of Transfer: Generalization and Maintenance

Generalization refers to the extent to which what was learned in a training program is used in different situations on the job. Royer (1979) uses the term stimulus generalization to define generalization as defined above. Appropriate measures of generalization require a linking of needs assessment information, a clear understanding of the content to be learned in the training program, and, finally, how the learning is to be used on the job (Baldwin & Ford, 1988). An impact map is a tool...
which might be very helpful in linking the connection between needs, learning objectives, and usage objectives (Brinkerhoff & Gill, 1994).

In a study of maintenance of behavior, Michalak (1981) found an almost perfect correlation between the amount and quality of behavior maintenance activities and the transfer results obtained by departments in a manufacturing setting. Maintenance activities that might be conducted outside the classroom include positive reinforcement, feedback, removal of obstacles, changes in work systems, performance appraisals, and a buddy or accountability system (Michalak, 1981; Wexley & Latham, 1991).

In summary, the five components for effective transfer, according to Baldwin and Ford (1988), include training design, trainee characteristics, work environment, training outcomes, and conditions of transfer. In this study, even though all five components are important, only the work environment component was manipulated.

Ungsrithong (1991), in a study of realistic training previews and the impact on transfer, states that training professionals cannot afford to leave the transfer issue to chance. Because transfer issues have not been consistently considered in the past, variables in the training and back on the job are interfering with successful transfer. These variables, which get in the way of successful transfer of training, could be referred to as barriers. Broad and Newstrom (1992) wisely make the point that barriers are more easily resolved when they are well defined and classified.

**Barriers to Transfer of Training**

According to Broad and Newstrom (1992), not a lot is known about barriers to transfer of training. Huczynski and Lewis (1980), in a study of management training programs and transfer, identified four basic barriers to training. The first was
an overload of work. Second was unplanned work, which frequently creates mini-
crises. The third barrier showed that it is often difficult to convince older people to
apply new ideas or practices. The final barrier was the high rate at which things
change.

Mathieu et al. (1993) highlight the importance of being able to identify and
minimize barriers within the entire training system, not just the training itself. The
research and scholarly writing that has been conducted around barriers to effective
transfer identify two general types of barriers: individual and organizational (Broad &
Newstrom, 1992; Gilbert, 1996; Huczynski & Lewis, 1980; King, 1996; Mathieu et
al., 1993).

Gilley and Coffern (1994) identified nine barriers to successful transfer of
training. These barriers were then divided between individual barriers and
organizational barriers as shown in Table 1.

Table 1
Barriers to Transfer of Training

<table>
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<tr>
<th>Organization</th>
<th>Individual</th>
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<tr>
<td>• lack of reinforcement</td>
<td>• trainee’s perception of impractical programs</td>
</tr>
<tr>
<td>• interference with immediate work</td>
<td>• trainee’s perception of irrelevant training content</td>
</tr>
<tr>
<td>environment</td>
<td>• trainee’s discomfort with change and associated</td>
</tr>
<tr>
<td>• nonsupport of organizational culture</td>
<td>effort</td>
</tr>
<tr>
<td></td>
<td>• separation from inspirational support of the training</td>
</tr>
<tr>
<td></td>
<td>• trainee’s perception of poorly designed and</td>
</tr>
<tr>
<td></td>
<td>delivered training</td>
</tr>
<tr>
<td></td>
<td>• pressure from peers to resist changes</td>
</tr>
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</table>
All too often organizations attempt to solve performance problems through training. It is easy to place the blame on individuals rather than on the management processes. Yet, Gilbert (1996) claims that for any given performance problem, the cause can be found in a behavior repertory, or in the environment that supports the repertory, or in both. And, ultimately the cause will be found in a deficiency of the management system (the organization). Behavior, which is a building block of performance, requires a person's repertory of skill and the environment.

In a study of self-efficacy, Mathieu et al. (1993) found that there were two levels of constraints: situational constraints and individual level constraints. Situational constraints were defined as characteristics of the environment that interfere with or restrict employee performance. The researchers defined individual level constraints as obligations or pressures placed on individuals that may differ from person to person. The research showed that trainees who felt they had more individual constraints (pressure/time demands) were less likely to develop a belief that they could master the skills being trained. It suggests that managers must give careful attention to the obligations and pressures that their employees need to balance while attending training. Training does not occur in isolation from other job and personal obligations, and merely providing release time to attend training is probably not sufficient to maximize training effectiveness.

A Hybrid, Research-Based Model for Supporting Transfer of Training

Baldwin and Ford (1988) analyzed the previous research related to transfer of training, and the conclusion made was that more efforts at model development were needed. These researchers went on to state that no studies were found that tested organizational interventions. Given that Dean et al. (1996) claim that the work
environment within which employees work has a tremendous impact on performance, any transfer support must also focus on the job environment to which the trainees return.

The purpose of this study was to test certain practical methods that were intended to enhance transfer of given training interventions. These methods were based on an "ideal" model for transfer enhancement, constructed from best-practices derived from previous transfer research and advice. This section presents and describes this "ideal" transfer model and identifies the precedents on which it is based.

The hybrid model, from which this research is based, is a combination of the works of Broad and Newstrom (1992) and Tracey, Tannenbaum, and Kavanagh (1995). The major components of the model include the organizational context, the before training transfer partnership (Phase 1), during training partnership (Phase 2), the after training partnership, and the transfer climate. The transfer of training partnerships, pre- through post- transfer enhancement efforts, and the organization’s contextual issues are drawn from Broad and Newstrom. The in-depth understanding of the organizational context and the transfer climate stem from the work of Tracey et al. (see Figure 1).

Phase 1

Phase 1 includes all the work that takes place prior to training. During this pre-training effort, a training transfer partnership is formed, a needs assessment is conducted, the design and development of the training program is completed, and readiness efforts for the training are begun.
Organizational Context

Phase 1
Before Training Transfer Partnership

Phase 2
During Training Transfer Partnership

Phase 3
After Training Transfer Partnership

Figure 1. The Hybrid, Research-Based Transfer of Training Model.

Broad and Newstrom (1992) suggest that training transfer partnerships are formed by including a training professional, the manager of the area seeking assistance, and an employee who might participate in the training. Working together, the partnership assumes the responsibility for each of the steps in Phase 1.

The needs assessment is critical. If true training needs are not identified, what is learned and what is transferred may be irrelevant. Noe and Schmitt (1986) argue that trainees who perceive the needs assessment to be credible will react favorably to the training. Readiness, or motivation to learn, can be defined as a specific desire to learn the training program content (Noe & Schmitt, 1986).

Phase 2

Phase 2 involves the actual delivery of the training program and during training partnership. Phase 2 is similar to Brinkerhoff's (1987) Stages III and IV, or the program implementation and immediate outcome stages. What is of primary
concern is that trainees learn what was intended. Also key is the continuation of the partnership formed between the manager(s), the trainer, and the trainees participating in the training. Broad and Newstrom (1992) identify several things the manager can do to support the training effort while it is taking place. The manager can prevent interruptions, transfer work assignments, communicate and provide support, monitor attendance and attention during training, recognize participation, participate in transfer action planning, review what is being/has been learned, and develop an assessment strategy for determining how the transfer of training process is going once the employee is back on the job.

Broad and Newstrom (1992) also define the partnership roles of the trainer and the trainees. The trainer needs to make sure training is relevant, application-oriented, full of practice and feedback opportunities, and provides job aides (when appropriate). Trainees need to link with a training transfer partner and support networks, maintain an ideas and applications notebook, actively participate in training, plan for application of the newly acquired SKAs (skills, knowledge, and attitudes), and create behavioral contracts. Knowles (1987) strongly encourages the use of learning contracts to enhance the benefits of training.

Phase 3

Phase 3 concentrates on making sure that what was learned during the training program is applied back on the job (Broad & Newstrom, 1992). The transfer of training challenge now lies in the hands of the manager and the employees (trainees). Brinkerhoff and Gill (1994) claim that it is the manager/supervisor who is primarily responsible for the results of Phase 3 efforts.
The manager needs to consider and develop a plan for the trainees to re-enter their work, to support the transfer efforts psychologically, to provide reality checks and opportunities to practice what was learned, to encourage dialogue around transfer-related issues, to reduce job pressures for a period of time after training, to set mutual expectations for performance improvement, and to provide feedback and role models. Accomplishing each item listed above creates a common thread between course content and on-the-job usage (Georgenson, 1986).

The trainees should be encouraged to practice self-management, to periodically review the training content and newly acquired SKAs, and to maintain contact with training buddies and support networks. In a study contrasting self-management and goal setting, Gist et al. (1990) found that self-management techniques were more effective in terms of influencing transfer of training. While Broad and Newstrom (1992) suggest that training buddies are an effective transfer technique, not all agree. Nadler (1970), in a study of the hard-core unemployed, stated that while buddy systems are commonly supported as effective training and transfer techniques, these systems are not very effective. Nadler claims that “buddies” must come together naturally if positive results are to be expected. Therefore, it might be more effective to let pairings, or small groups, form without the direction of the trainer or management.

According to Broad and Newstrom (1992), the trainer’s main role after training is completed is to serve as a resource for managers and trainees. The trainer can provide problem-solving assistance, refresher courses, etc.
Organizational Context and Transfer Climate

In their 10-year follow-up study to the classic work by Baldwin and Ford (1988), Ford and Weissbein (1997) report that more sophisticated theoretical and operational measures of key work environmental factors have been developed. The general feeling among training professionals is that the organizational context is key to successful transfer (King, 1996). Noe and Schmitt (1986) claim that the influence of the work environment on trainability is a factor that should not be overlooked. Recent research suggests that the organizational context is at least as important as learning in facilitating transfer (Foxon, 1997).

Georgenson (1982) makes the point that an important factor in how effectively SKAs are transferred back to the job depends on how completely the training program content is integrated into organizational policies, norms, forms, etc. As previously stated, Ford et al. (1992) defined organizational factors as the goals, objectives, values, and culture of an organization. This definition is contrasted against the work context, which includes supervisory attitude towards the trainee, work group support, and the pace of work. Tracey et al. (1995) describe it as the transfer of learning climate, referring to perceptions about the work environment which facilitate or inhibit the use of trained skills and behaviors on the job.

For the purpose of this project, organizational context will be defined as the strategic goals, objectives, policies and procedures, supervisory and peer support (social context as defined by Noe & Schmitt, 1986), norms, and culture. Rummler and Brache (1990) state that an exemplary performer who is placed into a poorly run organization will lose every time. The performance system (the organization) is stronger than any employee, no matter how well-trained. Because of this statement,
and all the other acknowledgment of the impact of the organizational context upon job performance and, specifically, transfer of training, organizational context must be included in the proposed model.

In an ideal situation, the organization would be fully supportive and ready to embrace trainees following training. This readiness and supportive transfer climate could naturally occur or the organization might be re-engineered prior to implementing the training program. Unfortunately this type of environment does not frequently exist.

The organizational context and Phase 3 are difficult to differentiate. In general, the managerial or supervisory role is just one component of the organizational context. The manager's or supervisor's role in creating a supportive environment is to provide the coaching, feedback, reinforcement, and support, which allows the trainee to successfully put into practice what is learned in training. Broad and Newstrom (1992) state that the immediate supervisor's or manager's support for implementing what is to be, or was, learned is one of the most critical pieces for transfer to occur. Baldwin and Ford (1988) agree that support is critical and can take many forms, such as goal setting; reinforcement of behavior; accountability to see that skills are used; modeling of skill usage; and praise, better assignments, or other forms of extrinsic rewards. Huczynski and Lewis (1980) found that the immediate supervisor must be an innovative supporter. Baldwin and Ford (1988) also go on to say that more work in defining supervisory support is needed. Foxon (1997), in a study of employees at a Fortune 100 company, found it was manager support that facilitated transfer more than other variables being considered (action planning or post-course motivation). What has been described in this paragraph is a part of what
others have described as transfer climate (Rouiller & Goldstein, 1993; Tracey et al., 1995).

The actions that take place in Phases 1 through 3 and that are a part of the organizational context create the transfer climate. Transfer climate is the common thread between Phases 1, 2, and 3, as well as the organizational context. Rouiller and Goldstein (1993) define transfer climate as “those situations and consequences which either inhibit or help facilitate the transfer of what has been learned in training into the job situation” (p. 379). The intent of this study is to determine to what extent the transfer enhancement process tools could be used to create a positive transfer climate as evidenced in supervisor and trainer behaviors.

The logic behind transfer climate and transfer of training is that if the trainees sense a positive transfer climate, they are more likely to apply the new skill, knowledge, or ability than if they sense a negative transfer climate. In his article describing the dual dimensionality of training transfer, Laker (1990) supports the relationship between visible support for the training (a supportive transfer climate) and the likelihood that the trainee will initiate the transfer. Laker’s statement is supported by the work of others (Baldwin & Ford, 1988; Leifer & Newstrom, 1990; Noe, 1986). It is expected that as the recognition of a positive transfer climate increases, so will the likelihood that what was learned will result in job behavior.
CHAPTER III

DESIGN AND METHODOLOGY

Introduction

The study involved the test of an applied training transfer enhancement process for improving the transfer of a particular training as it was implemented in a West Michigan manufacturing company. The chapter begins with an overview of the design, includes a description of the participating organization and the trainees involved, a description of the training program, an overview of the intervention design, a description of the transfer enhancement tools, a discussion of the instrumentation, a description of the data collection procedures, and ends with the conceptual and operational hypotheses.

Participating Organization

This research of the transfer enhancement process was conducted in a manufacturing company located in Grand Haven, Michigan. The company, to be referred to as the “manufacturer,” is a privately-held corporation with annual sales of approximately $200 million, employing over 800 persons. The manufacturer produces a variety of products primarily in the automotive and office furniture industries which are shipped throughout the world, including Japan and Europe.

The manufacturer has developed training programs for managers, supervisors, lead persons, hourly production employees, etc., as a part of a comprehensive
training and development strategy. The manufacturer’s comprehensive training system was recognized by their national industrial trade association in 1998.

The primary selection criterion for the manufacturer to participate in the study was the demonstration that training was related to specific desired business results. Secondary criteria for selection included a compatible training time line and the desire to participate in such a study.

The training program conducted as a part of this study was basic problem-solving skills. The class was taught by a highly-qualified, private sector training consultant.

The trainees were selected for involvement in the training program based on a thorough needs assessment facilitated by the internal employee development staff and supervisors. Supervisors were eligible to participate in this study if they planned to have at least three direct reports participating in the training.

The Training

The training program covered basic problem-solving skills. The half-day course covered the manufacturer’s problem-solving process/model, how to complete a cause and effect analysis (fishbone diagram), basic action planning, and decision-making when following the problem-solving process/model. The same trainer was used throughout the entire training project. The training was conducted in the manufacturer’s technical training center.

Design Overview: Transfer-Enhancement Intervention

The study was designed with three major components: pre-training efforts, efforts during the training, and efforts which took place after the training. A graphical
representation and quick summary of the transfer-enhancement intervention design can be found in Figure 2.

Figure 2. Overview of the Transfer-Enhancement Intervention.

Two pieces of the intervention occurred prior to training. First, the trainees' supervisors and the trainer participated in orientation sessions. Second, with one group the transfer enhancement tools (impact maps) were used by the supervisors with their trainees. With the other group of trainees, the supervisors sent the trainees to training as done in the past. The intent of discussing the impact maps prior to training was to increase the expectations for learning and application (transfer).
During training, two transfer enhancement tools were used by the trainer with the same group of trainees whose supervisors were using the transfer enhancement tools. The other group of trainees, whose supervisors were not using the tools, did not use any transfer tools during training either. Upon completion of training the trainees returned to the work environment with higher SKA levels (skill, knowledge, and attitude). Not only were trainees returning to work with higher SKA levels, but for the group of trainees who had been using the transfer enhancement tools before and during training, the expectation was that they were to use the SKAs on the job. In other words, transfer was expected to occur.

Following training, only the trainees who had used the transfer enhancement tools before and during training met with their supervisors to complete the last piece of the transfer enhancement process. During this post-training meeting, using a worksheet as a guide, the supervisors and trainees discussed what was learned, how the new SKAs could be used on the job, and what support was needed to help the trainees transfer what was learned.

The Transfer Enhancement Tools

As introduced in the previous section, the training transfer enhancement process was implemented before, during, and after training to address transfer climate issues within the organizational context. The purpose of this type of transfer-enhancing strategy is to increase the transfer of newly acquired learning into the work environment. Several transfer-enhancing tools, which are the proprietary work of the Self Management Institute, were used as practical approaches in the transfer process. The transfer enhancement process tools are located in Appendix B.
The specific transfer enhancement process tools were used by treatment group supervisors, trainers, and trainees at various stages before, during, and after training. The various tools were not intended to be systematically used by the comparison group.

**The Pre-Training Tool**

The High Performance Impact Map was the first transfer enhancement process tool to be used. This tool was used prior to training between the supervisor and the trainee. The High Performance Impact Map assisted in the identification of specific learning outcomes and how each directly links to high leverage tasks/actions, to performance improvement targets, and to business outcomes. The High Performance Impact Maps were developed cooperatively by the supervisors, trainer, and researcher. A sample High Performance Impact Map can be found in Appendix B.

**The During-Training Tools**

The first “during training” transfer enhancement process tool was the Performance Support Systems Analysis Worksheet. The worksheet helped trainees consider the work environment in which the new SKAs must be applied. Conditions which might help or hinder transfer were identified. An example of a potential hindrance is “the fast pace of work . . . no time for formal problem solving.” The other “during training” tool was the Learning Application Plan Worksheet. This tool was designed to close the loop between the Performance Systems Analysis Worksheet and the High Performance Impact Map. Goals, specific action plans, and support needs were defined using this worksheet.
The Post-Training Tool

The final transfer enhancement process tool was the Supervisory Support Worksheet. The purpose of this final worksheet was to assist supervisors and trainees in outlining specific plans for resolving trainee support needs.

Instrumentation

Transfer climate, perceived transfer of training level, and tool usage were the focus of the data collection process. The data collection techniques included surveys and interviews. See Table 2 for an overview of the data collection and analysis process.

Transfer climate was measured at two main points in the study: pre- and post-training. The surveys ("TTC-Pre" and "TTC-Post"), for all trainees/participants, included 19 Likert-scale items which asked participants to identify the level of certain behaviors resulting in transfer climate. The content of the survey was based upon the work of Broad and Newstom (1992), Ford (1990), and Montesino (1995). During the development process, both surveys were reviewed by training and data collection experts. The TTC-Pre and TTC-Post surveys can be found in Appendix C.

Transfer was measured using the Trainee Transfer Self-Reporting Questionnaire (TTSRQ). The TTSRQ asked the trainees to self-report usage and transfer. The survey was based upon the learning objectives and work behaviors as identified on the High Performance Impact Map. Each knowledge or skill item was rated on a Likert scale identifying the level of usage/transfer. The survey is modeled after the data collection methodology and instruments developed by Cruz (1997). Survey items in the Cruz study used Likert scales to measure the extent to which
Table 2
Data Collection Process and Instruments

<table>
<thead>
<tr>
<th>Key Question</th>
<th>Measurement Procedure</th>
<th>When Administered</th>
<th>Analysis and Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>What transfer enhancing processes are already in place in the study sites?</td>
<td>1. Survey trainees: report of transfer support factors typically observed</td>
<td>Before any intervention</td>
<td>Used as “baseline” for both treatment and comparison groups</td>
</tr>
<tr>
<td>How much, often, and how did supervisors and trainers make use of the processes and tools provided them?</td>
<td>2. Interview supervisors and trainers: report of usage of transfer enhancement process... and tools (TERI)</td>
<td>6 weeks after training</td>
<td>Used to report on usability of process and to compare to amount of transfer reported</td>
</tr>
<tr>
<td>What transfer enhancements did supervisors and trainers implement?</td>
<td>3. Interview supervisors and trainers: report of implementation of transfer enhancing activities (TIRI)</td>
<td>6 weeks after training</td>
<td>Will compare to and correlate with amount of transfer reported</td>
</tr>
<tr>
<td>To what extent did trainees notice enhancements?</td>
<td>4. Survey of trainees: report of observation and effects of transfer enhancement action taken by supervisors and trainers</td>
<td>6 weeks after training</td>
<td>Is a measure of “impact” of the trial process: will compare to amount of transfer reported</td>
</tr>
<tr>
<td>To what extent did trainees actually transfer (ie. use) their training?</td>
<td>5. Survey of trainees: self-report of implementation of learning acquired in training, i.e. transfer (TTSRQ)</td>
<td>6 weeks after training</td>
<td>Hypothesis 1: treatment groups’ transfer will be greater than comparison groups’ transfer (TTSRQ)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hypothesis 2: individual overall transfer will be positively correlated with individual transfer climate recognition (TTSRQ with TTC-Post)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hypothesis 3: individual transfer climate recognition will be positively correlated with degree of tool usage (TTC-Post with TIRI)</td>
</tr>
</tbody>
</table>

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trainees performed certain tasks on the job. The TTSRQ survey was reviewed by training and data collection experts prior to use. The TTSRQ survey can be found in Appendix D.

Transfer-enhancement tool usage was measured through the Transfer-Enhancement Reporting Interview (TERI) format. Nine questions asked the supervisors and trainer to identify what they had done, or not done, to build a transfer climate before, during, and after training. Which transfer-enhancement tools were used in support of these actions and how often the tools were used following the training were measured with the Tool Implementation Reporting Interview (TIRI) format. The TIRI asked the supervisors and trainer to rate the extent to which they used each of the transfer-enhancement tools on a 4-point Likert scale. Both the TERI and the TIRI interview formats were reviewed by data collection experts. The two interview formats can be found in Appendix E.

Data Collection Procedures

Surveys and standardized interviews were used to collect data regarding transfer of training climate, transfer of training, and tool usage. For ease of tracking and anonymity, trainees and supervisors were assigned a 7-digit code which was used to connect trainees to their supervisor, their training section, and either the treatment or the comparison group.

SPSS 8.0 for Windows was used for data entry and statistical analysis. Incomplete surveys were dropped from the study.
Pre-Training

Through the use of a survey (TTC-Pre survey), pre-intervention measures of training transfer climate were taken. The pre-training measure of transfer climate asked trainees what supervisors and trainers had typically done before, during, and after training to support transfer. The TTC-Pre surveys were internally mailed to all trainees and were completed prior to the training. The surveys were returned to the manufacturer’s human resources department in sealed envelopes.

During Training

The study was structured so that no data were formally gathered during the training process. The bulk of the data to be collected was gathered following training.

Post-Training

Trainees completed two surveys 6 weeks after training. First, all trainees completed a survey which was intended to measure the transfer climate. This post-training transfer climate survey, TTC-Post, asked trainees to focus on transfer-enhancing behaviors exhibited by their supervisors and trainer. The TTC-Post survey was identical to the TTC-Pre. Surveys were internally mailed to trainees, with completed surveys returned to the manufacturer’s human resources department in sealed envelopes.

Six weeks after the completion of training, all trainees were asked to complete a second survey which reported their own perceived levels of transfer using the TTSRQ survey. As with the other surveys, the TTSRQ surveys were internally
mailed to trainees. Completed surveys were returned to the human resources department in sealed envelopes.

The final pieces of data collection were related to the transfer-enhancement process and tool usage. The researcher collected these data through personal interviews with the supervisors and trainer who had used the transfer-enhancement tools. The Transfer-Enhancement Reporting Interview (TERI) and Tool Implementation Reporting Interview (TIRI) formats were strictly followed. The time required to complete each interview was approximately 20 minutes.

The research project protocol was reviewed by the Human Subjects Institutional Review Board prior to implementation. A copy of the university authorization is located in Appendix F.

Hypotheses

Three hypotheses were tested through this study. Each hypothesis is stated in both conceptual and operational terms.

Hypothesis 1

The first conceptual hypothesis addresses the issue of amount of transfer. The conceptual hypothesis states that transfer will be greater among the group of trainees whose supervisors use the transfer enhancement tools (treatment group) than that of the group of trainees whose supervisors do not use the tools (control group). The operational hypothesis states that the mean “overall TTSRQ effectiveness” rating (self-report) of the treatment group will be greater than the mean “overall TTSRQ effectiveness” rating (self-report) of the control group at the 0.10 level.
Hypothesis 2

The second conceptual hypothesis relates reported transfer to perceived changes in the transfer environment. That is, specifically stated, the level of transfer will be positively correlated with reported improvements in the transfer environment. Operationally, the Pearson product-moment correlation between the individual "overall TTSRQ effectiveness" ratings and the individual "overall TTC-Post" ratings will be greater than zero (0) at the .10 level.

Hypothesis 3

The third conceptual hypothesis tested answers the question of whether there is a relationship between the extent to which trainees notice transfer enhancements, and how the supervisors and the trainer actually used the various transfer enhancement process tools. In other words, it was hypothesized that the more the supervisors and the trainer used the tools, the more trainees would report a positive transfer climate. In operational terms:

1. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual supervisor TIRI-High Performance Impact Map ratings will be greater than 0 at the .10 level.

2. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual trainer TIRI- Performance Support Systems Analysis Worksheet rating will be greater than 0 at the .10 level.

3. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual trainer TIRI- Learning Action Plan Worksheet will be greater than 0 at the .10 level.
4. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual supervisor TIRI- Supervisor Support Action Plan Worksheet will be greater than 0 at the .10 level.

The significance, or alpha, level for each hypothesis was set at .10. The rationale is that the risks of making Type I or II errors were not significant. This is especially true when research and theory supported recognition of transfer climate as key for transfer to occur. Furthermore, the sample size of the study was relatively small.
CHAPTER IV

ANALYSIS OF FINDINGS

In this chapter the results of the statistical analyses of the data are presented and described. First, the composition of the sample is described. A baseline measure of the transfer climate is presented, followed by the transfer climate measure taken following the training and research intervention. The results of each statistical analysis related to transfer of training, transfer of training and recognition of the transfer climate, and recognition of the transfer climate as related to each of the transfer enhancement process tools are explained. Finally, the results of testing each hypothesis are presented and described.

Description of the Sample

The sample included 62 trainees and their respective 21 supervisors. The trainees and supervisors represented various operations-type departments throughout the manufacturing company. The trainees were a mixture of operators, set-up personnel, technical support, and lead persons in the production, tool room, maintenance, and receiving departments. The trainees were split into two groups: those whose supervisors and trainer would use the transfer enhancement tools ($N = 31$) and those supervisors and trainer who would not use the tools ($N = 31$). Of the supervisors who participated in the study, 15 had trainees in the both groups, 3 had trainees only in the group which used the transfer enhancement tools, while 3 more had trainees only in the group which did not use the tools.
Baseline Transfer Climate

In an effort to establish a baseline measure of transfer climate, a pre-training measure of transfer climate was taken using the TTC-Pre survey. The assumption going into the study was that the transfer climate experienced by the trainees in the past would not be significantly different between the two groups. The results are identified in Table 3. Transfer climate is defined as the situations and consequences which inhibit or help facilitate transfer of what has been learned in training into the job situation (Rouiller & Goldstein, 1993).

The mean reported transfer climate score was 2.59 for the group whose supervisors and trainer would not be using the transfer enhancement process and tools, and 2.76 for the group whose supervisors and trainer would be using the transfer enhancement process and tools. At the .10 alpha level, no difference was found in reported transfer climate between the two groups prior to becoming involved with the present study.

Because no difference was found in the transfer climate experienced by the two groups of trainees prior to this study, one can make the assumption that the transfer climate, in the past, was similar for both groups. This finding of no difference

Table 3
TTC-Pre Transfer Climate Measures (Overall)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Cases</th>
<th>Mean</th>
<th>SD</th>
<th>t Value</th>
<th>One-tailed Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Transfer Enhancement Process</td>
<td>31</td>
<td>2.59</td>
<td>.98</td>
<td></td>
<td>-0.63</td>
</tr>
<tr>
<td>Transfer Enhancement Process</td>
<td>31</td>
<td>2.76</td>
<td>1.12</td>
<td></td>
<td>.27</td>
</tr>
</tbody>
</table>
was further expected, as many trainees in both groups shared the same supervisor. Being able to state that the two groups were similar going into the study allows for making more valid comparisons and contrasts during the study.

Transfer Climate Between the Two Groups

A foundational assumption of the study is that when trainees recognize a positive transfer climate, transfer is more likely to occur. Another assumption being made is that employees will recognize changes in the transfer climate. Changes in the transfer climate were made prior to, during, and after training as a result of the use of the transfer enhancement tools. The transfer climate after these interventions were implemented was measured using the TTC-Post survey. The results are shown in Table 4.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Cases</th>
<th>Mean</th>
<th>SD</th>
<th>t Value</th>
<th>One-tailed Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Transfer Enhancement Process</td>
<td>31</td>
<td>2.58</td>
<td>.99</td>
<td>-1.90</td>
<td>.03</td>
</tr>
<tr>
<td>Transfer Enhancement Process</td>
<td>31</td>
<td>3.03</td>
<td>.87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There was a difference in the mean reported score of the overall transfer climate between the group whose supervisor and trainer used the enhanced transfer tools and the group whose supervisor and trainer did not use the transfer enhancement tools. The group not involved with using the transfer enhancement tools reported a mean of 2.58, while the group whose supervisors and trainer used the
transfer enhancement tools reported a mean of 3.03. With a two-tailed significance of .03, a null hypothesis can be rejected at a .10 alpha level. The transfer climates experienced by the two groups were different.

The analysis indicates that there is a difference between the two groups after the transfer climate interventions were made. This is noteworthy because it supports the assumptions that the trainees would experience and report different transfer of training climates. The findings also lay the foundation for potential differences in perceived transfer rates following the training. Had no differences been reported between the two groups of trainees, one would further speculate that no differences in transfer could be anticipated.

The trainees whose supervisors and trainer used the transfer enhancement process and tools reported a higher overall transfer climate score than the group whose supervisors and trainer did not use the transfer enhancement process and tools.

Overall Reported Transfer Between the Two Groups

The scholarly and popular literature regarding transfer of training suggests that there is a relationship between transfer climate and transfer of training. Given the differences in transfer climate experienced by the two groups, a difference in transfer might also be expected. Transfer of training, as used in this study, was defined as the degree to which trainees reported that they had applied to their jobs the knowledge, skills, and attitudes they gained in training (Holton, Bates, Seyler, et al., 1997b).

In response to the TTSRQ survey question regarding overall transfer, the trainees \(N = 31\) whose supervisors and trainer did not use the transfer enhancement tools reported a mean score of 2.65 and a standard deviation of .75. The mean
transfer reported by the group of trainees \((N = 31)\) whose supervisors and trainer did use the transfer enhancement tools had a mean of 2.74, with a standard deviation of 0.93. The data relative to the overall transfer of the two groups of trainees are presented in Table 5.

<table>
<thead>
<tr>
<th>Group</th>
<th>Cases</th>
<th>Mean</th>
<th>SD</th>
<th>(t) Value</th>
<th>One-tailed Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Transfer Enhancement Process</td>
<td>31</td>
<td>2.65</td>
<td>0.75</td>
<td>-0.45</td>
<td>0.33</td>
</tr>
<tr>
<td>Transfer Enhancement Process</td>
<td>31</td>
<td>2.74</td>
<td>0.93</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The analysis of the overall transfer reported by the two groups of trainees resulted in inconclusive findings. No difference between the two means was found. In other words, the transfer reported by the group of trainees whose supervisors and trainer used the transfer enhancement process and tools is not different from the transfer reported by the group whose supervisors and trainer did not use the transfer enhancement process and tools.

The lack of a difference in overall transfer, while it does not immediately support the hypothesized difference between groups, is not especially troubling, since further analysis indicated that real differences in transfer probably did exist.

In summary, the comparison of the two groups’ overall transfer was inconclusive. The transfer scores were not found to be different from each other.
Relationship Between Transfer Climate and Transfer Reports

The transfer of training climate was measured through the Transfer of Training Climate (TTC-Post) survey. Overall recognition of the transfer climate was reported through the TTC-Post survey’s final question: “Overall, my supervisor and trainer encouraged me before, during, and after training, to use on the job what I had learned in training.” The Transfer of Training Self-Report Questionnaire (TTSRQ) was used for trainees to self-report the perceived level of training transfer. Overall training transfer was reported on the TTSRQ survey’s final question: “Overall, how effectively have you been able to use what you learned in the problem-solving training?” The Pearson product-moment correlation between the overall individual transfer of training and the individual overall transfer climate recognition reported by the trainees ($N = 62$) was .639 (see Table 6).

Table 6

<table>
<thead>
<tr>
<th>Overall Climate Recognition</th>
<th>Overall Reported Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Climate Recognition</td>
<td>$r$</td>
</tr>
<tr>
<td>sig. (one-tailed)</td>
<td></td>
</tr>
<tr>
<td>Overall Reported Transfer</td>
<td>$r$</td>
</tr>
<tr>
<td>sig. (one-tailed)</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .10 level.

The correlation found between individual overall transfer and overall climate recognition is moderate. Hinkle, Wiersma, and Jurs (1988) reported that a Pearson
A relationship between the overall transfer climate experienced by trainees and the self-reported transfer has been established. As trainees experienced a more positive transfer climate, they were more likely to transfer what was learned.

**Relationship Between Transfer Climate and Implementation of the Transfer Enhancement Process**

The transfer enhancement process was comprised of four tools. The tools included were (1) the High Performance Impact Map, (2) the Performance Support Systems Analysis Worksheet, (3) the Learning Action Plan Worksheet, and (4) the Supervisor Support Action Plan Worksheet. These tools were used to facilitate an enhanced transfer of training climate.

The supervisors and trainer involved in this study were asked to report the extent to which the tools were used during the Tool Implementation Reporting Interview (TIRI). Usage of each of the tools was self-reported on a 4-point Likert scale, rating utilization from “not at all” to “a great deal.” Individual overall recognition of the transfer climate as reported by trainees (TTC-Post) was correlated with reported tool usage (TIRI) on the part of their supervisors.

Pearson product-moment correlations were calculated for each relationship ($N = 62$). The correlation between individual overall transfer climate recognition and usage of the impact map was .117. The correlations between individual overall transfer climate recognition and use of the systems analysis worksheet and the action planning worksheet were both .238. The correlation between individual overall transfer climate recognition and use of the supervisor support follow-up worksheet
was .333. Table 7 identifies the correlation between transfer climate recognition and usage of each of the transfer enhancement process tools.

Table 7

Correlation Between Overall Transfer Climate Recognition and Supervisor/Trainer Report of Transfer Tool Usage

<table>
<thead>
<tr>
<th></th>
<th>Impact Map</th>
<th>System Analysis</th>
<th>Action Plan</th>
<th>Follow-up Meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>$r$</td>
<td>.117</td>
<td>.238*</td>
<td>.333*</td>
</tr>
<tr>
<td>Transfer</td>
<td>sig. (one-tailed)</td>
<td>.183</td>
<td>.031</td>
<td>.004</td>
</tr>
</tbody>
</table>

*Significant at the .10 level.

As indicated in Table 7, relationships were established between overall transfer climate recognition and three of the four transfer enhancement tools. While the relationships were established, the correlations are generally weak. Hinkle et al. (1988) stated that correlations of less than .30, and in the range of .30-.50, are considered to be rather weak. In general, the more the Performance Support Systems Analysis, the Learning Action Plan, and the Supervisor Support Action Plan worksheets were reported to be positively used, the more positive the transfer climate was recognized to be, though this relationship was relatively weak.

The correlation between the High Performance Impact Map and overall transfer climate recognition was quite low. The analysis of the correlation between the two led to inconclusive results. This means that a relationship between use of the impact map and overall transfer climate cannot be supported by the data in this study.

In summary, no relationship between the use of the High Performance Impact Map and its effect on overall transfer climate was established. However, relationships
between use of the Performance Support Systems Analysis, the Learning Action Plan,
and the Supervisor Support Action Plan worksheets and overall transfer climate
recognition were supported.

Hypothesis Testing

Hypothesis 1

The first hypothesis states that transfer will be greater among the group of
trainees whose supervisors and trainer used the transfer enhancement tools (treatment
group) than that of the group of trainees whose supervisors and trainer did not use
the tools (control group). The operational hypothesis states that the mean “overall
TTSRQ effectiveness” rating (self-report) of the treatment group will be greater than
the mean “overall TTSRQ effectiveness” rating (self-report) of the control group at
the 0.10 level.

A t test for independent means was employed to test the difference between
the mean “overall TTSRQ effectiveness” rating reported between the trainees who
did not use the transfer enhancement process and those trainees who did. The mean
overall TTSRQ effectiveness rating of the group which did not use the transfer
enhancement tools was 2.65, while the mean overall TTSRQ effectiveness rating of
the group which did use the transfer enhancement tools was 2.74. The probability is
.654 that the difference in sample means occurred by chance, if the population means
are equal. Therefore, the null hypothesis that the mean overall transfer ratings of the
two groups are equal cannot be rejected when using an alpha level of .10. The data as
to the relationship between general overall transfer and the use of the transfer
enhancement tools are inconclusive.
Hypothesis 2

The second hypothesis related self-reported transfer to perceived changes in the transfer environment between the group which used the transfer enhancement tools and the group that did not use the tools. Specifically stated, the level of transfer will be positively correlated with reported improvements in the transfer environment. Operationally, the Pearson product-moment correlation between the individual “overall TTSRQ effectiveness” ratings and the individual “overall TTC-Post” ratings will be greater than zero (0) at the .10 level.

The Pearson product-moment correlation of .639 exists between the two variables. With a significance of .000, the null hypothesis can be rejected. These data suggest that as the transfer climate is reported to be more positive, then the reported level of transfer also increased.

Hypothesis 3

It is believed, in this final set of hypotheses, that the more the supervisors and trainers use the tools, the more trainees will report a positive transfer climate. In operational terms:

1. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual supervisor TIRI-High Performance Impact Map ratings will be greater than 0.

2. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual trainer TIRI- Performance Support Systems Analysis Worksheet rating will be greater than 0.
3. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual trainer TIRI- Learning Action Plan Worksheet will be greater than 0.

4. The Pearson product-moment correlation between individual overall TTC-Post ratings and the corresponding individual supervisor TIRI- Supervisor Support Action Plan Worksheet will be greater than 0.

Each of these hypotheses was tested at a .10 alpha level.

The result of Hypothesis 3 (overall transfer climate recognition and use of the impact maps) is a correlation of .117. With a one-tailed significance of .183, the null hypothesis cannot be rejected. The data as to the relationship between the use of the impact maps and overall transfer climate recognition are inconclusive.

The result of testing Hypothesis 3 (overall transfer climate recognition and the use of the performance system analysis worksheet) is .238. The one-tailed significance was .031, which supports rejection of the null hypothesis in favor of this hypothesis.

The result of testing Hypothesis 3 (overall transfer climate recognition and the use of the action planning worksheet) is also .238. The one-tailed significance was .031, which supports rejection of the null hypothesis in favor of this hypothesis.

The relationship between overall transfer climate recognition and follow-up support offered by supervisors after training was tested in Hypothesis 3. The Pearson product-moment correlation between these two variables is .333. Once again, the null hypothesis can be rejected at an alpha level of .10, with a one-tailed significance of .004.

Relationships between the impact of the remaining three transfer enhancement tools (performance system analysis worksheet, action planning worksheet, and post-
training supervisory support worksheet) and recognition of the overall transfer climate were supported. Given these data, one could assume that the more the three tools are used, the greater the likelihood a supportive transfer climate would be recognized.

Further Analysis of Reported Transfer

The hypothesis that the trainees in the group whose supervisors and trainer used the transfer enhancement tools would report greater overall transfer than the trainees whose supervisors and trainer did not use the tools was not supported. In this case, "overall" transfer was operationally defined as the response to the final survey question. The final TTSRQ question asked trainees: "Overall, how effectively have you been able to use what you learned in the problem-solving training?" Further analysis of other research suggests that this sort of general transfer was not likely to occur. Brinkerhoff and Gill (1994) suggest that training which is focused on a limited number of learning objectives is more likely to be effective than training which covers many learning objectives. Their hypothesis is that "just enough training" will be more effective than the training program that focuses on a broad array of general objectives. That is, training is more likely to transfer when trainees are helped to focus on only those objectives which most directly bear on the particular aspects of their jobs that are important to achievement of business objectives. Therefore, additional analysis relative to reported transfer of training was warranted.

In this research study, the transfer enhancement procedures employed were intended to help training isolate just a few (1–3) of the total program objectives that their supervisors believed would be most important to their work unit's business
objectives. The impact mapping tool, in particular, and the post-training action plans most directly addressed the result of isolating a few learning and transfer objectives.

It was hypothesized that among the group whose supervisors and trainer used the transfer enhancement tools (N = 31) the areas of specific, expected transfer would be greater than the remaining areas of general transfer. In operational terms, within the group of trainees whose supervisors used the transfer enhancement process and tools, the difference between the mean of the four TTSRQ survey items which were defined as "highly expected areas of transfer" and the mean of the remaining TTSRQ survey items will be greater than zero (0) at an alpha level of .10.

To complete the data analysis and test this additional hypothesis, further analysis was required. For each employee it was necessary to identify the particular job behaviors among the entire set that were most likely to transfer. Following this identification process, specific job behaviors needed to be linked to specific items on the TTSRQ survey.

Independent from the data analysis, the researcher identified job behaviors which were to be transferred. Several steps were taken to accomplish the identification and prioritization of job behaviors. First, job classifications were provided by the manufacturer's human resources department. Next, the trainee job classifications and High Performance Impact Maps (developed for each job classification grouping) were matched. Then, job duties as identified on the impact maps were prioritized according to their job-specific and organizational importance. Job behaviors were rated into one of four priorities: highly important (4), important (3), somewhat important (2), and unimportant (1). This analysis was based upon notes from the impact map development process and discussions with the
supervisors. Once completed, the job behavior ratings were reviewed for accuracy with the manufacturer's training manager.

The job behaviors from the impact maps were then linked to specific items on the TTSRQ survey. Using the job behavior ratings as identified above, the survey items could be generally prioritized into the four categories. Based upon the general prioritization, process notes from the development of the impact maps, and discussions with the supervisors, the specific TTSRQ survey items were ranked in order of expected transfer. The four highest ranked survey items were identified for each of these trainees. The "highly expected items of transfer" are defined as the four highest ranked survey items for each trainee. The remaining TTSRQ survey items were also grouped for each trainee. The means for each trainee's "highly expected items of transfer" and "remaining possible transfer items" were calculated.

The mean reported transfer rating of the "highly expected items of transfer" was 2.70, while the mean of the "remaining possible transfer items" was 2.51. The standard deviations are .67 and .66, respectively. The mean of the paired differences is .19 with a standard deviation of .43.

A t test for differences in the paired sample was conducted to test this hypothesis. The paired-sample t test resulted in a one-tailed significance of .01. Therefore, the null hypothesis was rejected in favor of the alternative hypothesis (see Table 8).

The further analysis of transfer supported the belief that creating a positive transfer climate should result in increased transfer. The data clearly pointed to a higher level of transfer among the areas of highly expected transfer than the remaining areas of potential transfer.
Table 8

Highly Expected Areas of Transfer Versus Remaining Areas of Transfer

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>Paired Differences</th>
<th>t</th>
<th>One-tailed Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highly Expected Items of Transfer</td>
<td>2.70</td>
<td>.19</td>
<td>.43</td>
<td>2.49</td>
</tr>
<tr>
<td>Remaining Possible Transfer Items</td>
<td>2.51</td>
<td>.43</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The final chapter contains discussion of the findings. Limitations of the study and recommendations for further study are identified.
CHAPTER V

DISCUSSION AND CONCLUSIONS

This research project was intended to develop, implement, and test a transfer of training enhancement process. The process was operationalized through the use of four transfer enhancement tools. The tools allowed supervisors, a trainer, and trainees to focus on transfer issues before, during, and after training. In this final chapter the findings are discussed, conclusions are drawn, and recommendations for further study are made.

Transfer Climate

The trainees were divided into two groups, one whose supervisors and trainer used the transfer enhancement process and tools, and the other whose supervisors and trainer did not use those procedures. The groups reported different overall transfer climates, as reported in the previous chapter. The group whose supervisors and trainer used the transfer enhancement process and tools reported a more positive transfer climate than the group whose supervisors and trainer did not use the transfer enhancement process and tools.

Supervisor behaviors and actions have been shown to largely impact the transfer climate and therefore transfer of training. Brinkerhoff and Montesino (1995), in their study at a Fortune 200 pharmaceutical company, found that when supervisors supported training, trainees experienced less inhibiting factors and more support. In other words, they experienced a more positive transfer climate. Similarly, Holton,
Bates, and Leimbach (1997) found that supervisors are key to the transfer climate. Their factor analysis study reported that a majority of the transfer climate subconstructs were tied directly to supervisor behaviors and actions. Based upon the previous scholarly and popular literature, given a difference in the transfer climate, a difference in transfer could be expected. In the Bates, Holton, Seyler, and Carvalho (1998) study of 73 production operators, transfer climate accounted for a significant proportion of the variance in performance. Transfer climate was therefore believed to demonstrate a fair amount of predictive power relative to performance.

The data supported a relationship between overall transfer climate recognition and use of most of the transfer enhancement tools. However, the data regarding the use of the High Performance Impact Map and a relationship to overall transfer climate recognition were inconclusive. In theory, the use of the High Performance Impact Map should have led to the establishment of a relationship between transfer climate and the use of the tool. Brinkerhoff and Montesino (1995) reported that when perceived supervisory support is strong, training transfer tends to be greater than when support is not there. It is important to note that the transfer enhancement tools are not entirely independent of each other. Furthermore, Brinkerhoff and Montesino also found that the supervisor’s behaviors and actions did not need to be very sophisticated, only that they were doing “something” to support transfer of training.

It is highly likely that the reason for inconclusive results was a lack of experimental controls. Of the supervisors who were to use the training impact map, 12% reported that they found it confusing and difficult to use. An additional 29% found it useful for a discussion about the upcoming training, but didn’t fully follow the protocol. The remaining 59% of supervisors used the impact map as described in
the protocol and found it to be very helpful in conveying the importance of using what was learned in training, for both the trainee and the company.

A relationship was established between overall transfer climate recognition and the use of the performance systems analysis and action planning tools. These tools allowed trainees to focus on the application of the problem-solving training to immediate “real” situations. These findings are supported by Tracey et al. (1995), whose research suggests that incorporating discussions and skill-building exercises on how to overcome barriers to transfer facilitates application of trained skills and behaviors to the work setting.

A relationship was also established between overall transfer climate recognition and the use of the supervisor support process and worksheet following completion of training. The reported correlation coefficient of .333 was lower than expected, probably because the tool was not used to its fullest value. Of the supervisors who used the supervisor support worksheet, 7% reported that the worksheet was confusing and they had difficulty using it. The remaining 93% found it to be helpful for discussing how the training would be used and any support that might be necessary. Of those who used the tool, 20% reported that it created extra paperwork, which indicated a negative reaction.

The findings of this study regarding supervisory support and follow-up after training reinforce the findings of Lee and Pucel (1998). Their study found a strong relationship between supervisors’ reinforcement of transfer behaviors and reported transfer.

In testing the second hypothesis, a relationship between overall climate recognition and overall transfer of training was supported. Transfer climate is the mediating factor between the organizational context and the individual’s attitudes.
towards on-the-job behaviors, according to Holton, Bates, Seyler, et al. (1997b). As trainees recognize a more positive transfer climate, the more likely they are to transfer what was learned into job behaviors. This relationship is also theoretically supported by numerous studies. Mathieu et al. (1992) found that the transfer climate can either support or inhibit use of new SKAs on the job. Bates et al. (1998), in their study of factors affecting transfer in an industrial setting, reported that transfer climate accounted for a significant portion of the variance in performance ratings. Based on their findings, they claim that transfer climate may have incredible predictive powers for transfer of training.

The results of the initial analysis of the primary research hypothesis were inconclusive. Given prior research, one would expect to see a difference in reported transfer levels between the group of trainees whose supervisors and trainer used the transfer enhancement tools and the group whose supervisors and trainer did not. As discussed in Chapter IV, however, this initial analysis was based upon a very general report of transfer on all of the objectives of the training program.

Further analysis of reported transfer provided more positive results. When the areas of highly expected transfer were compared with the remaining areas of potential transfer, a difference was reported. “Appropriate transfer,” according to Pea (1987), requires being selective based upon individual purposes, tasks, and thinking situations. Pea’s findings coincide with the results of the further analysis of the transfer data. When trainees enter training with a clear understanding of the expectations for learning and transfer, transfer is more likely to occur. Similarly, Brinkerhoff and Gill (1994) believe that training, theoretically, is most effective when it is focused on just-enough training. No extraneous content is learned, to be forgotten through the lack of use (transfer), or to interfere with more essential
learning. Learning, in a just-enough training environment, focuses on the few tasks that could be transferred into job behaviors and performance. Each of the transfer enhancement tools supported specific, rather than general, areas of transfer.

Use of the transfer enhancement tools with the training program allowed for trainees in the treatment group to be focused on only the pertinent learning objectives. The transfer climate recognized by this group whose supervisors used the transfer enhancement tools was found to be more positive than the transfer climate experienced by the comparison group. When transfer climate and focused trainees come together, transfer is more likely to happen. This connection supports other transfer research.

Contrary to the writings of Broad and Newstrom (1992) and Leifer and Newstrom (1980), the pre- and post-training transfer efforts were largely carried through by the internal training function and the researcher, which, for all practical purposes, was an extension of the training function. Broad and Newstrom identified the supervisor/manager portion of the transfer partnership to be the key role before and after training. The findings of this study call into question just how “practical” and “realistic” the implementation of Broad and Newstrom’s transfer partnerships may be in a typical manufacturing company. The fact remains, increasing transfer of training is hard work.

Conclusions

Several transfer of training relationships were substantiated through this study. First, the baseline assumption that employees will recognize a positive transfer climate, when presented, was supported. Second, a relationship between recognition of the transfer climate and supervisor/trainer reported use of the three of the four
transfer enhancement tools was established. Third, a linkage between transfer climate recognition and self-reported transfer of training was identified. Finally, further analysis of the reported transfer data indicated a higher level of transfer among the behaviors that were especially focused on in the transfer enhancement process used by the supervisors.

This study supports the contention that transfer can be enhanced when supervisors and trainers work with trainees to help them understand what they are expected to learn and use on the job. The trainer needs to establish a learning environment that supports application of the new SKA. The supervisor needs to provide a work environment that encourages and supports transfer of newly acquired SKAs to on-the-job behaviors. Finally, training must be focused on a few key learning objectives for those trainees attending the training. Training programs which are broad in focus will not likely result in the level of transfer achieved by narrowly focused training. The application of just-in-time and just-enough training concepts will increase the likelihood of transfer. When these occur, a positive transfer climate is established, and transfer is much more likely to happen.

Recommendations for Further Study

As stated in other scholarly articles, further efforts to operationalize and improve transfer climate are necessary. This study could be improved upon and repeated. To improve upon the present study would require tighter experimental controls, particularly around the use of the High Performance Impact Map and the Supervisor Support Action Plan Worksheet.

Lee and Pucel (1998), in their study of Korean supervisors, found that (a) when trainees perceived certain training objectives to be more important, they
also reported greater levels of perceived transfer; and (2) the types of reinforcement that trainees found to be most motivating were also the most frequently used reinforcement behaviors. This study makes sense theoretically; however, it lacked experimental control in the use of the transfer enhancement tools.

Of the supervisors who participated in this study, 29% reported that they did not use the impact maps exactly as planned, and another 12% found the tool to be somewhat confusing. At the same time, 7% of the supervisors had difficulty using the post-training support worksheets. The expectation was that had the tools been used exactly as planned, transfer levels would have been greater. The same is true of the connection between usage of the tools and recognition of a more positive transfer climate.

Another limitation of this study was the small number of subjects. With only 31 trainees in each group (N = 62) and 21 supervisors, the power of the study was limited. The fact that 15 of the supervisors had trainees in both groups (those who used the transfer enhancement tools and those who did not use the tools) and 6 had trainees in only one of the two groups may have skewed the results. In addition to the control concerns listed above, sample sizes should be increased. The result would be a more powerful study (Hinkle et al., 1988).

Further improvement to this study might include the methods of transfer measurement. Transfer could, and perhaps should, be measured in ways other than trainee self-reporting. Cruz (1997) questioned the use of self-reporting in measures of training transfer. Does a self-report provide a valid measure of transfer of training? Other options include observation and supervisor reports of transfer. Tziner, Haccoun, and Kadish (1991) used employee self-reports of transfer as well as supervisor ratings of skill usage. The findings of the two methods were different,
suggesting that multiple methods of transfer measurement would be advisable. In an update of the classic transfer summary research work conducted by Baldwin and Ford (1988), Ford and Weissbein (1997) reported that a number of studies used supervisor or peer judgments to evaluate transfer. Their sense was that these studies showed that the researchers gave more careful attention to evaluating transfer.

Another consideration for future study is the methodology for measuring transfer climate. Holton, Bates, Ruona, and Leimbach (1998) have developed, tested, and continue to test a generalized transfer climate questionnaire (the Learning Transfer Questionnaire). The benefit of using a standardized measurement plan is that information would be more readily compared, thus potentially adding to the body of knowledge related to transfer of training and transfer climate.
Appendix A

Flowchart of Logic for Study
Appendix B

Transfer Enhancement Process Tools
PROBLEM-SOLVING TRAINING
High Performance Impact Map (Rollform Operator)

**Learning Objectives**
- Communicate each step in the problem-solving process/model
- Utilize a fishbone diagram to analyze a problem, identifying the root cause
- Communicate the main points of an action plan
- Make a decision based upon the problem-solving model

**Work Activities**
- Troubleshoot through the roll forming process
- Identify who can help solve the problem
- Identify the problem and root cause
- Identify problems before they occur (e.g. mechanical failure)
- Complete CAR's

**Job Outputs**
- Problems solved and/or avoided - short and long term
- Produced high quality
- Documented problems
- Limited downtime

**Core Requirements**
- Production efficiency
- Production downtime
- Scrap rate
- In-house quality
- Preventative maintenance
- Lost time injuries
Using What I Learned in Problem-Solving Training

<table>
<thead>
<tr>
<th>These will keep me from using what I learned</th>
<th>Ways my supervisor (or others) can help</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Ways that I can use what I learned in Problem-Solving Training (basic action planning)
SUPERVISORY SUPPORT WORKSHEET

Review the following worksheets developed before and during training:
- High Performance Impact Map
- Performance Support Systems Analysis
- Learning Application Plan

Ask your employee to briefly summarize the learning application plan. Make sure the plan is workable.

<table>
<thead>
<tr>
<th>SUPPORT NEED</th>
<th>HOW I WILL HELP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discuss the support requested of you. How will you, the employee's supervisor, assist and/or support the employee in implementing what was learned?

<table>
<thead>
<tr>
<th>TYPE OF FOLLOW-UP</th>
<th>WHEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discuss a follow-up plan.

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Appendix C

The Data Collection Tools: Trainee Perceptions of Transfer Climate Surveys (TCC-Pre and TCC-Post)
SURVEY OF PARTICIPANTS REGARDING TRAINING CLIMATE (PRE-INTERVENTION) (TTC-Pre)

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Trainer</th>
<th>Supervisor</th>
</tr>
</thead>
</table>

CONSENT
You are invited to participate in a research project entitled "The Field Study of a Training Transfer Enhancement Process and Its Effect of Management Behavior and Transfer of Training" designed to analyze the organizational training climate in which training results in job behavior. The research is being conducted by Dr. Robert Brinkerhoff and Andrew Bowne from Western Michigan University, in the department of Educational Leadership, in order to fulfill the requirements of Mr. Bowne's dissertation. This survey is comprised of a series of questions to rated on a four point scale and will take approximately 5-10 minutes to complete. Your replies will be completely anonymous, so do not put your name anywhere on the form. If you choose not to participate in this survey, you may either return the blank survey or you may discard it in the box provided. Participating or not participating will have no effect on employment status. Returning the survey indicates your consent for use of the answers you supply. If you have any questions, you may contact Dr. Robert Brinkerhoff at (616) 387-3881, Andrew Bowne at 842-3860, the Human Subjects Institutional Review Board at (616) 387-8293, or the Vice President for Research at (616) 387-8298.

PART I. The following is a list of conditions that sometimes exist before training occurs. Please indicate, by circling the appropriate number on the response scale, the extent to which they applied to you when you have attended training in the past. Please use the following scale: 1 = Not at all, 2 = Somewhat, 3 = Very much, 4 = A great deal

<table>
<thead>
<tr>
<th>Before training, the trainer(s) or my supervisor: Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td>involved me in assessing my training needs</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>discussed the importance of training and on course objectives, content, and application/connection to my job</td>
<td>2 3 4</td>
</tr>
<tr>
<td>developed an agreement with me to maximize results from the course</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>provided time for completion of pre-course assignments</td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>

PART II. The following is a list of conditions that sometimes exist during training. Please indicate, by circling the appropriate number on the response scale, the extent to which they applied to you when you have attended training in the past. Please use the following scale: 1 = Not at all, 2 = Somewhat, 3 = Very much, 4 = A great deal

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**During training, my trainer(s):**

<table>
<thead>
<tr>
<th>Provided realistic work-related tasks</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answered the &quot;WIFI M&quot; question</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discussed the importance of training and on course objectives, content, and application/connection to my job</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provided individual feedback on my learning (understanding, comprehension, application, etc.)</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Helped me create action plans to put into practice the SKAs learned back on the job</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provided opportunities to practice what I learned while still in training</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conducted sessions to anticipate what might trip me up when trying to apply the new SKAs back on the job</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

**During training, my supervisor:**

<table>
<thead>
<tr>
<th>Monitored my attendance in training sessions</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communicated to me, very clearly, his/her support for the training while I was participating</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

**PART III.** The following is a list of conditions that sometimes exist after training occurs. Please indicate, by circling the appropriate number on the response scale, the extent to which they applied to you when you have attended training in the past. Please use the following scale: 1 = Not at all, 2 = Somewhat, 3 = Very much, 4 = A great deal

**After training, my trainer(s):**

<table>
<thead>
<tr>
<th>Provided follow-up support after training</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provided refresher/problem-solving sessions</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

**After training, my supervisor:**

<table>
<thead>
<tr>
<th>Encouraged my attempts to apply the newly acquired SKAs</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>Provided me with opportunities to practice new SKAs soon after training</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Gave me positive reinforcement for the demonstration of behaviors taught in the course</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**PART IV.** Please indicate, by circling the appropriate number on the response scale, the extent to which they apply to you. Please use the following scale: 1=Not at all, 2=Somewhat, 3=Very much, 4=A great deal.

<table>
<thead>
<tr>
<th>Overall, in the past, my supervisor and trainer(s) encouraged me before, during, and after training, to use on the job what I had learned in training.</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
SURVEY OF PARTICIPANTS REGARDING TRAINING CLIMATE
(6 WEEKS POST-INTERVENTION)

Course Title
Problem Solving

Trainer

CONSENT
You are invited to participate in a research project entitled "The Field Study of a Training Transfer Enhancement Process and Its Effect of Management Behavior and Transfer of Training" designed to analyze the organizational training climate in which training results in job behavior. The research is being conducted by Dr. Robert Brinkerhoff and Andrew Bowne from Western Michigan University, in the department of Educational Leadership. This survey is comprised of a series of questions to rated on a four point scale and will take approximately 5-10 minutes to complete. Your replies will be completely confidential and anonymous, so do not put your name anywhere on the form. If you choose not to participate in this survey, you may either return the blank survey or you may discard it in the box provided. Returning the survey indicates your consent for use of the answers you supply. If you have any questions, you may contact Dr. Robert Brinkerhoff at (616) 387-3881, Andrew Bowne at 842-3860, the Human Subjects Institutional Review Board at (616) 387-8293, or the Vice President for Research at (616) 387-8298.

PART I. The following is a list of conditions that sometimes exist before training occurs. Please indicate, by circling the appropriate number on the response scale, the extent to which they apply to you. Please use the following scale: 1=Not at all, 2= Somewhat, 3= Very much, 4= A great deal

Before Problem-Solving training, the trainer(s) or my supervisor:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Very much</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td>involved me in assessing my training needs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>discussed the importance of training and on course objectives, content, and application/ connection to my job</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>developed an agreement with me to maximize results from the course</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>provided time for completion of pre-course assignments</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
PART II. The following is a list of conditions that sometimes exist during training. Please indicate, by circling the appropriate number on the response scale, the extent to which they apply to you. Please use the following scale: 1 = Not at all, 2 = Somewhat, 3 = Very much, 4 = A great deal

During Problem-Solving training, my trainer(s):

<table>
<thead>
<tr>
<th>Condition</th>
<th>Not at all</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>provided realistic work-related tasks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>answered the &quot;WIIFM&quot; question</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>(WIIFM= What’s In It For Me)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>discussed the importance of training and on course objectives, content,</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>and application/connection to my job</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>provided individual feedback on my learning</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>(understanding, comprehension, application, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>helped me create action plans to put into practice the SKA learned back</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>on the job (SKA= skills, knowledge, abilities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>provided opportunities to practice what I learned while still in training</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>conducted sessions to anticipate what might trip me up when trying to</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>apply the new SKA back on the job (SKA= skills, knowledge, abilities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During Problem-Solving training, my supervisor:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Not at all</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>monitored my attendance in training sessions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>communicated to me, very clearly, his/her support for the training while</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I was participating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART III. The following is a list of conditions that sometimes exist after training occurs. Please indicate, by circling the appropriate number on the response scale, the extent to which they apply to you. Please use the following scale: 1=Not at all, 2=Somewhat, 3=Very much, 4=A great deal.

After Problem-Solving training, my trainer(s):
- provided follow-up support after training: Not at all 1, Somewhat 2, Very much 3, A great deal 4
- provided refresher/problem-solving sessions: Not at all 1, Somewhat 2, Very much 3, A great deal 4

After Problem-Solving training, my supervisor:
- encouraged my attempts to apply the newly acquired SKAs (SKA= skills, knowledge, abilities): Not at all 1, Somewhat 2, Very much 3, A great deal 4
- provided me with opportunities to practice new SKAs soon after training (SKA= skills, knowledge, abilities): Not at all 1, Somewhat 2, Very much 3, A great deal 4
- gave me positive reinforcement for the demonstration of behaviors taught in the course: Not at all 1, Somewhat 2, Very much 3, A great deal 4

PART IV. Please indicate, by circling the appropriate number on the response scale, the extent to which they apply to you. Please use the following scale: 1=Not at all, 2=Somewhat, 3=Very much, 4=A great deal.

Overall, my supervisor and trainer(s) encouraged me before, during, and after training, to use on the job what I had learned in training.
Appendix D

The Data Collection Tools: Trainee Transfer
Self-Reporting Questionnaire (TTSRQ)
Trainee Transfer Self-Reporting Questionnaire (TTSRQ)

**CONSENT**

You are invited to participate in a research project entitled “The Field Study of a Training Transfer Enhancement Process and Its Effect of Management Behavior and Transfer of Training” designed to analyze the organizational training climate in which training results in job behavior. The research is being conducted by Dr. Robert Brinkerhoff and Andrew Bowne from Western Michigan University, in the department of Educational Leadership. This survey is comprised of a series of questions to rated on a four point scale and will take approximately 5-10 minutes to complete. Your replies will be completely confidential and anonymous, so do not put your name anywhere on the form. If you choose not to participate in this survey, you may either return the blank survey or you may discard it in the box provided. Returning the survey indicates your consent for use of the answers you supply. If you have any questions, you may contact Dr. Robert Brinkerhoff at (616) 387-3881, Andrew Bowne at 842-3860, the Human Subjects Institutional Review Board at (616) 387-8293, or the Vice President for Research at (616) 387-8298.

Please rate to what extent you performed each item listed below since you completed the Problem-Solving training.

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A great deal</th>
<th>Doesn't Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. reviewed your production against standard (using production reporting information) to identify possible problems</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. reviewed your down time to identify problems</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. analyzed your scrap rate(s) against acceptable levels</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. identified a problem with a part you were running and got help right away</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. met with people from your work team to discuss problems</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. proposed (to your boss) an idea for an improvement in your job</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. used brainstorming to come up with suggestions for making improvements</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Not at all</td>
<td>A great deal</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>8.</td>
<td>completed a fishbone diagram to determine the root causes of a problem(s)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>used brainstorming to suggest causes of a problem</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10.</td>
<td>to save time (or work), skipped from defining the problem to implementing a solution</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11.</td>
<td>asked your supervisor, QC, maintenance, or engineering for help in dealing or solving a problem</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12.</td>
<td>asked a co-worker for help in dealing with or solving a problem</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13.</td>
<td>helped others solve a problem</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14.</td>
<td>worked step-by-step through your job (process) to troubleshoot a problem</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15.</td>
<td>skipped the troubleshooting process when you had seen similar type problems</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>16.</td>
<td>reviewed your team's safety record to identify problems</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>17.</td>
<td>analyzed your work area for potential safety hazards</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>18.</td>
<td>assisted your supervisor, or your team, in completing a Corrective Action Report</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>19.</td>
<td>used problem-solving skills to identify a problem before it occurred (to prevent a problem from occurring)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20.</td>
<td>skipped writing an action plan because of the lack of time and because people knew what had to be done</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Overall, how effectively have you been able to use what you learned in the PROBLEM-SOLVING training?

<table>
<thead>
<tr>
<th></th>
<th>Not very Effectively</th>
<th>Very Effectively</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Appendix E

The Data Collection Tools: Transfer Enhancement Reporting Interview (TERI) and Tool Implementation Reporting Interview (TIRI) Formats
CONSENT

You are invited to participate in a research project entitled "The Field Study of a Training Transfer Enhancement Process and Its Effect of Management Behavior and Transfer of Training" designed to analyze the organizational training climate in which training results in job behavior. The research is being conducted by Dr. Robert Brinkerhoff and Andrew Bowne from Western Michigan University, in the department of Educational Leadership, in order to fulfill the requirements of Mr. Bowne's dissertation. This survey is comprised of a series of questions to rated on a four point scale and will take approximately 5-10 minutes to complete. Your replies will be completely anonymous, so do not put your name anywhere on the form. If you choose not to participate in this survey, you may either return the blank survey or you may discard it in the box provided. Participating or not participating will have no effect on employment status. Returning the survey indicates your consent for use of the answers you supply. If you have any questions, you may contact Dr. Robert Brinkerhoff at (616) 387-3881, Andrew Bowne at 842-3860, the Human Subjects Institutional Review Board at (616) 387-8293, or the Vice President for Research at (616) 387-8298.

1. What did you do with your trainees prior to training?
2. How did you do it? Did you use any tool(s)?
3. How helpful were the tools (on a scale of 1-4, one being low and four being high)?
4. What did you do with your trainees during training?
5. How did you do it? Did you use any tool(s)?
6. How helpful were the tools (on a scale of 1-4, one being low and four being high)?
7. What did you do with your trainees after training?
8. How did you do it? Did you use any tool(s)?
9. How helpful were the tools (on a scale of 1-4, one being low and four being high)?
Tool Implementation Reporting Interview (TIRI) Format
Implementation of Transfer Enhancement Tools
(Supervisors and Trainers)

CONSENT
You are invited to participate in a research project entitled "The Field Study of a Training Transfer Enhancement Process and its Effect of Management Behavior and Transfer of Training" designed to analyze the organizational training climate in which training results in job behavior. The research is being conducted by Dr. Robert Brinkerhoff and Andrew Bowne from Western Michigan University, in the department of Educational Leadership, in order to fulfill the requirements of Mr. Bowne's dissertation. This survey is comprised of a series of questions to rated on a four point scale and will take approximately 5-10 minutes to complete. Your replies will be completely anonymous, so do not put your name anywhere on the form. If you choose not to participate in this survey, you may either return the blank survey or you may discard it in the box provided. Participating or not participating will have no effect on employment status. Returning the survey indicates your consent for use of the answers you supply. If you have any questions, you may contact Dr. Robert Brinkerhoff at (616) 387-3881, Andrew Bowne at 842-3860, the Human Subjects Institutional Review Board at (616) 387-8293, or the Vice President for Research at (616) 387-8298.

To what extent did you use the following tools:

<table>
<thead>
<tr>
<th>Tool</th>
<th>Not at all</th>
<th>A great deal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Route to Learning Impact Map</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>Performance Support Systems Analysis Worksheet</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>Learning Action Plan Worksheet</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>Supervisor Support Action Plan Worksheet</td>
<td>1 2 3 4</td>
<td></td>
</tr>
</tbody>
</table>

Comments:
Appendix F

Human Subjects Institutional Review Board Approval
Date: 18 June 1998

To: Robert Brinkerhoff, Principal Investigator
    Andrew Bowne, Student Investigator

From: Richard Wright, Chair

Re: HSIRB Project Number 98-06-06

This letter will serve as confirmation that your research project entitled "The Field Study of a Training transfer Enhancement Process and Its Effect on Management behavior and Transfer of Training" has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 18 June 1999
Date: 6 October 1998

To: Robert Brinkerhoff, Principal Investigator
   Andrew Bowne, Student Investigator for dissertation

From: Sylvia Culp, Chair

Re: Changes to HSIRB Project Number 98-06-06

This letter will serve as confirmation that the changes to your research project “The Field Study of a Training Transfer Enhancement Process and Its Effect on Management Behavior and Transfer of Training” requested in your memo dated 29 September 1998 have been approved by the Human Subjects Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 18 June 1999


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