RELATIONSHIP OF TEAM TRAINING COMPONENTS
TO PERCEPTIONS OF TEAM PERFORMANCE

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The purpose of this research study was to identify the specific components of team training that contribute most to a team's ability to perform effectively. The analysis conducted involved examining the relationship between the Training Support System Survey (Hall, 1998) along with the Training Strategies and Training Content sub-scales, and the overall measure of team performance from Beyerlein's (1996) Perceptions of Team Performance survey. Results were mostly inconclusive, due to limitations of the research. However, a few interesting findings were found related to team training for different types of teams. In addition, this research is helpful in moving toward a better understanding of the relationship between team training and team performance and pointing toward the need for additional research in this area.
ACKNOWLEDGEMENTS

This research was partially funded by the National Science Foundation grant, "Transformation to Quality Organizations," grant #SBR-9422368. Appreciation is extended to Dr. Christopher Hall for use of his Support Systems Survey and Dr. Michael Beyerlein for use of his Perceptions of Team Performance instrument.
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CHAPTER I

INTRODUCTION

Overview of Thesis

The purpose of this thesis is to identify the specific components of team training that contribute most to effective team performance. This research will help fill an existing gap in the team research, as well as point toward future research that is needed to better understand the relationship between team training and team performance. The following literature review contributes to a better understanding of team training and team performance, and helps shape the hypotheses that will be tested as part of this research.

Overview of Teams

Importance and Benefits of Teams

The use of teams in organizations has become extremely popular. Business leaders and team researchers alike agree on the value that teams bring to organizations, and expect the use of teams will continue to increase as organizations strive for even higher levels of performance (Katzenbach & Smith, 1993). Survey results consistently indicate organizations in a variety of industries, ranging in size from small businesses to Fortune 500 companies, are using teams, and that the movement to teams is “one of the most dramatic changes in American business in recent history” (Reilly & McGourty 1998, p. 244). According to Tannenbaum, Salas and Cannon-Bowers (1996), teams, when at their best, are “ideal structures for generating and sharing knowledge, enhancing performance and improving satisfaction” (p. 504). Cannon-Bowers, Oser,
and Flanagan (1992) go so far as to state “there is clearly a consensus among those who study industrial and organizational behavior that work groups are the cornerstone of modern American industry” (p. 355). Katzenbach and Smith also predict the future importance of teams to organizations, reporting that “teams will be the primary building blocks of company performance in the organization of the future” (p. 173).

The increasing use of teams in organizations provides a strong indication that the results obtained in a team structure are above and beyond those obtained by individuals (Reilly & McGourty, 1998), and that teams are able to effectively adapt to changing demands in the business world (Mohrman, Cohen, & Mohrman, 1995). The list of proclaimed benefits achieved through the use of teams is lengthy. For example:

Increased productivity (e.g., Campion, Medsker, & Higgs, 1993; Cohen & Bailey, 1997; Reilly & McGourty, 1998)

Enhanced performance (Tannenbaum et al., 1996)

Greater employee satisfaction (e.g., Cohen, Ledford, & Spreitzer, 1996; Guzzo, 1995)

Reduced costs (Cohen & Bailey, 1997; Cohen et al., 1996)

Higher quality (e.g., Kinlaw, 1991; Steel & Jennings, 1992)

Higher performance ratings (Cohen et al., 1996)

Increased organizational performance and competitiveness (e.g., Cordery, 1996; Katzenbach & Smith, 1993)

Improved customer service and satisfaction (Guzzo, 1995; Reilly & McGourty, 1998; Sundstrom, 1999b)
Improved efficiency (Guzzo & Dickson, 1996)

Greater flexibility (Katzenbach & Smith, 1993; Reilly & McGourty, 1998; Sundstrom, 1999b)

Heightened ability to meet demands of increasingly complex work (Reilly & McGourty, 1998; Roberts, 1997; Salas & Cannon-Bowers, 2000)

Empowered employees (Shonk, 1992)

Increased creativity (Sundstrom, 1999b)

Greater motivation (Sundstrom, 1999b)

More sharing of knowledge (Tannenbaum et al., 1996)

Cannon-Bowers, Salas, and Converse (1993) support the benefits of teams in that “critical performance in many complex systems depends on the coordinated activity of a team of individuals” (p. 221). May and Schwoerer (1994) conclude that “work teams offer significant potential to help organizations succeed in accomplishing their goals” (p. 37). Sundstrom (1999a) sums up the benefits and importance of teams in organizations, as follows:

Work teams are integral to a new breed of high-involvement organization, evolving in an environment of global competition, rapidly evolving technology, and rising customer expectations….Properly designed and supported, work teams offer exactly what is needed: a platform for promoting creativity, motivating extraordinary performance, and enabling fast, flexible response to customers’ needs. Work teams allow “flat” organizational structures, with few hierarchical levels and maximum authority at the lowest levels. They give employees the opportunity to exercise responsibility and
authority – or empowerment. At the same time, work teams allow and require employees to develop new skills while working, a source of both satisfaction and challenge….Companies continue to report stunning success with work teams. (pp. 3-4)

Team Definition

Over the years, most prominent team researchers have developed their own somewhat unique definitions of what constitutes a team. For the most part, the various definitions have a lot of similarities, but differ slightly on one or more key criteria. Oftentimes, the same researchers or teams of researchers revise their definitions of a team as they learn more about teams through additional research. For example, Salas and colleagues revise their definition of a team slightly in each of their subsequent publications (e.g., Salas, Dickinson, Converse, & Tannenbaum, 1992; Salas, Cannon-Bowers, & Blickensderfer, 1993; Salas & Cannon-Bowers, 2000). This section provides a brief overview, in chronological order, of a few of the various team definitions that researchers have developed over the last 20 years.

In 1984, Dyer indicated that a major conceptual problem in the area of team research revolved around researchers’ inability to develop a commonly accepted definition of a team. Through his review of the literature at that time, he defined a team as “at least two people who are working towards a common goal/objective/mission, where each person has been assigned specific roles or functions to perform, and where completion of the mission requires some form of dependency among the group members” (p. 286). In 1992, Salas et al. (1992) examined other researchers’ definitions of a team in their efforts to define a team. The resulting definition indicates a team is a “distinguishable set of two or more people who interact dynamically,
interdependently, and adaptively toward a common and valued goal/objective/mission, who have each been assigned specific roles or functions to perform, and who have a limited life-span of membership” (p. 4). Central to this definition is that “task completion requires: (a) a dynamic exchange of information and resources among team members, (b) coordination of task activities (e.g., active communication, back-up behaviors), (c) constant adjustments to task demands, and (d) some organizational structuring of members” (Salas et al., p. 4).

In 1993, Salas et al. refined their definition of a team as a “set of two or more individuals who must interact cooperatively and adaptively in pursuit of shared, valued objectives. Further, team members have clearly defined differentiated roles and responsibilities, hold task-relevant knowledge, and are interdependent” (p. 82). Finally, in 2000, Salas and Cannon-Bowers reviewed the current literature and defined a team as “a set of two or more individuals who must interact and adapt to achieve specified, shared, and valued objectives….Team members must have meaningful task interdependencies and task-relevant knowledge….Teams have members with very defined and functional roles, share more than one information source…are hierarchically organized…and have a limited time span…the key issue in this definition is the notion of interdependency of action - interdependency shapes the nature of interaction” (p. 4).

According to these definitions, as well as other team definitions found in the literature, there appears to be consensus on several defining characteristics of a team. A team is composed of (a) two or more people with (b) specific roles and functions, who must (c) interact and adapt in an (d) interdependent and dynamic manner in order to (e) achieve shared and valued goals and objectives. Although Salas and colleagues (e.g., Salas & Cannon-Bowers, 2000; Salas et al.,
1992) include limited time span in their definition of a team, many researchers indicate that a team can be a permanent fixture in an organization (e.g., Cordery, 1996). Limited time span has not been included in the definition of a team for purposes of this thesis.

Teams versus Groups

Some team researchers make a distinction between a “group” and a “team.” For example, teams are often distinguished from groups according to their performance results. More specifically, teams differ from groups according to their outputs – group outcomes are influenced by individual member performance, while team performance results in collective work products (Katzenbach & Smith, 1993). “A group relies primarily on the individual contributions of its members for group performance, whereas a team strives for a magnified impact that is incremental to what its members could achieve in their individual roles” (Katzenbach & Smith, pp. 88-89). Teams are also distinguished from groups by their highly differentiated roles and task knowledge, and their greater degree of member interdependence (Orasanu & Salas, 1993).

Although some researchers support the distinction between a team and a group, most agree that research on small groups has relevance to team research, since teams and groups share a lot of characteristics (e.g., Guzzo, 1996), and that small group research offers insight into the understanding of teams (e.g., Tannenbaum, Beard, & Salas, 1992) and has contributed significantly to the knowledge of teams (Salas & Cannon-Bowers, 2000). Therefore, for the purposes of this review of team literature, research on small groups will be included as adding important knowledge to the understanding of teams, team effectiveness, and team training.
Types of Teams

Most prominent team researchers, at some point or another, have identified and defined what they deem to be the different types of teams. Like the many team definitions that have been developed by various researchers over the years, the categories or types of teams proposed by different researchers have a lot of similarities, but also typically differ on several key criteria or characteristics. This section gives a brief overview of the different types of teams that have been identified by a few prominent team researchers.

Cohen and Bailey (1997) categorize teams into four groups: work teams, parallel teams, project teams, and management teams. Work teams are defined as work units that are responsible for producing goods or providing services, and membership is typically stable, full-time, and well-defined. Parallel teams exist in parallel to an organization’s formal structure, have limited authority, consist of individuals from different work units or jobs, and are brought together to perform functions that the organization is not equipped to perform through its regular structure, such as making recommendations to solve a problem or identify opportunities for improvement. Project teams are typically time-limited and produce one-time outputs, such as new products or services. Management teams “coordinate and provide direction to sub-units under their jurisdiction, laterally integrating interdependent sub-units across key business processes….Management teams can help companies achieve competitive advantage by applying collective expertise, integrating disparate efforts, and sharing responsibility for the success of the firm” (Cohen & Bailey, p. 243).
Mohrman et al. (1995) also identify four types of teams: work teams, integrating teams, management teams, and improvement teams. Mohrman and colleagues’ definition of a work team is similar to Cohen and Bailey’s (1997) definition, in that these teams perform the work (provide products/services) that is central to the organization’s purpose. Integrating teams are responsible for ensuring that work across different parts of the organization fits together. Management teams are a special type of integrating team with responsibility for managing the design and performance of a unit or units. Improvement teams are responsible for making improvements to the organization’s processes and systems, such as process redesign teams and quality improvement teams, which is similar to the responsibilities of Cohen and Bailey’s project teams.

Shonk (1992) also breaks teams into four types: suggestion teams, problem solving teams, semiautonomous teams, and self-managing teams. Suggestion teams are identified as temporary work units that provide recommendations, but have little decision-making authority. Problem solving teams identify effective solutions to work-related problems. Semiautonomous teams have considerable input into their work processes, but are managed by a supervisor. Finally, self-managing teams have the freedom and responsibility to manage their day-to-day work.

Sundstrom (1999a, 1999b) identifies six types of teams: management teams, project teams, production teams, service teams, action and performing teams, and parallel teams. Management teams are composed of managers and their direct reports. Project teams are usually cross-functional, in which experts selected for their specialized skills come together to complete
a highly specialized task within a defined time period, then disband. Production teams include front-line employees who are responsible for producing tangible outputs. Service teams are made up of employees who conduct repeated transactions with customers. Action and performing teams consist of highly trained individuals who “conduct complex, time-limited engagements with audiences, adversaries, or challenging environments in performance events for which teams maintain specialized, collective skill” (Sundstrom, 1999a, pp. 20-21). Parallel teams are typically temporary teams that work outside of, but in parallel with, the primary processes of an organization in order to make recommendations for improvements to the organization’s processes and systems. Stevens and Yarish (1999) categorize teams into the same six classifications as Sundstrom: production teams, service teams, management teams, project teams, action teams, and parallel teams.

Hall (1998) identifies four categories of teams: management, problem-solving, professional or technical support, and performing. According to Hall, management teams are responsible for setting goals, overseeing projects and making decisions, while problem solving teams focus on solving short-term problems or performing short-term tasks. Professional or technical support teams provide long-term assistance to others in the organization and, finally, performing teams make the products or provide the services that are offered by the organization. For the purposes of this thesis, Hall’s classification of teams will be used to examine the training needs of different types of teams. This topic is explored further in a later section.

Team Effectiveness
According to Tannenbaum et al. (1996), team effectiveness refers to how well a team accomplishes its purpose or mission. They argue that although team effectiveness can be operationalized differently for different teams, it typically refers to team performance, as defined by the quality and/or quantity of the team’s products or services. However, most researchers agree that team effectiveness includes more than team performance defined by productivity and output, but refers to a team’s ability to have sustained performance over an extended period of time.

Various team researchers suggest different criteria for measuring team effectiveness. For example, Campion et al. (1993) identify productivity, employee satisfaction, and manager judgments as key criteria for team effectiveness, while Cohen and colleagues (Cohen & Bailey, 1997; Cohen et al., 1996) argue that quality and quantity of output, member attitudes about quality of work life, and behavioral outcomes are key indicators of team effectiveness. Guzzo and Dickson (1996) also identify group outputs as criteria for team effectiveness, but suggest that the consequences in place for group members and the enhancement of the team’s capability for future effective performance are other important criteria. Mohrman et al. (1995) indicate that team effectiveness be judged by team performance, which they define as group outputs meets standards, learning and improvements undertaken by the group, and group member satisfaction. Hackman (1990) also argues that quality and quantity of outputs are key indicators of team effectiveness, along with group work that enhances the capabilities of team members to work interdependently and group experiences that contribute to the growth and development of team members.
Various researchers have proposed different models of team effectiveness in order to explain the necessary factors for teams to perform at an optimal level. For example, Guzzo (1986) conducted a review of the team performance models that existed at that time. He concluded that group effectiveness was dependent upon the nature of the task, the existence of rewards, the availability of resources within the group and in the group’s environment, the team’s autonomy to make decisions, and the presence of appropriate performance strategies. Goodman, Ravlin, and Argote (1986) also reviewed the literature on team performance models and concluded that task characteristics, group composition and organizational factors are antecedents to team performance. However, Goodman and colleagues found that the most recent literature at that time gave greater consideration to the effects of the organizational environment on team performance than other factors.

May and Schwoerer (1994) stress the importance of team efficacy in determining team effectiveness. Team efficacy is defined as “the team members’ collective belief in their capability to perform their job” (p. 30). Team efficacy is fostered through successful job experiences, social modeling, verbal encouragement, and appropriate interpretation of stressful events. May and Schwoerer indicate that establishing a proper organizational context is one way in which managers can enhance team efficacy and, in turn, enhance team performance.

Tannenbaum et al. (1992) identify the different situational and organizational characteristics that affect team performance, and recommend task and team competencies that are necessary for teams to perform effectively. Their team effectiveness model suggests that organizational and situational characteristics, such as organizational climate, environmental
uncertainty, and resource scarcity, among others, combine with task characteristics, individual characteristics, work structure, team characteristics, team processes and team interventions to influence team outputs (e.g., team changes, team performance, individual changes). Similarly, after a comprehensive review of the literature on team performance, Salas and colleagues conclude that team performance is influenced by organizational and situational characteristics, task and work characteristics, and individual and team characteristics (Salas et al., 1992).

**Organizational Context – Support Systems**

The recent literature on team effectiveness indicates the importance of organizational factors in achieving optimal team performance. In fact, organizational context and resources are included in essentially all recent models of team effectiveness (Campion et al., 1993). Existing evidence suggests that the presence or absence of organizational supports can dramatically foster or limit team effectiveness (Hackman, 1990). In the introduction to his book on team effectiveness and decision-making, Guzzo (1995) recognizes that the importance of the team’s organizational context is a theme that different authors repeatedly mention in the chapters of his book. Hackman goes on to state, “if the full potential of work teams is to be realized, organizational structures and systems must actively support competent teamwork” (p. 500) and that the lack of organizational support is the “saddest of all team failures” (p. 501). He reports, “When a group is both excited about its work and all set up to execute it superbly, it is especially shattering to fail merely because the organizational supports required cannot be obtained. It is like being all dressed up and ready to go to the prom only to have the car break down en route” (Hackman, p. 501).
Hackman (1990) identifies the key organizational supports needed for team effectiveness as a reward system, an educational system, an information system, and necessary material resources. May and Schwoerer (1994) agree that these four systems are necessary for teams to be successful. Sundstrom (1999a, 1999b) identifies nine support systems that are needed for teams to perform effectively: team structure, staffing system, leader roles, training, measurement and feedback system, reward system, information system, communication technology, and facilities. Guzzo (1986) argues that resources in the organizational environment, including training and development opportunities, are important for group effectiveness.

In their review of nine different models of work team effectiveness, Hall and Beyerlein (2000) concluded that nine organizational support systems are critical for effective team performance. According to Hall and Beyerlein, the nine support systems required for team members to effectively work in a collaborative manner are: information systems, group design, executive management support, reward system, direct supervisor support, integration system, training system, performance appraisal, and defining performance.

Team Training

What is Team Training?

A training or educational system is one of the organizational support systems that is commonly cited as necessary for effective team performance. Training has been defined as “a systematic effort to facilitate the development of job related knowledge, skills and attitudes (KSAs). The specific knowledge, skills, and attitudes to be developed are determined and learning objectives are established prior to the start of the training. The training content is then
derived and structured to convey the critical KSAs and to meet the learning objectives” (Tannenbaum et al., 1992, p. 126). While this definition applies to team training, it is important to note that the training needed for team effectiveness is different from the training needed for individual effectiveness – team training should focus on different content than training for individuals (Kozlowski & Salas, 1997). Tannenbaum et al. (1996) define team training as “a set of instructional strategies and tools aimed at enhancing teamwork knowledge, skills, processes, and performance” (p. 516). Although Salas and Cannon-Bowers (1997) found several different, sometimes conflicting, definitions of team training in their review of the literature on this topic, they argue that team training needs to have clear content and specific objectives that focus on improving the ability of a group of individuals to work effectively as a team.

Team training uses strategies and tools that are similar to those used for individual training; however, in team training the focus is on enhancing KSAs related to teamwork (Tannenbaum et al., 1996). At the individual level, social and interpersonal skills are critical for individuals to fill the role requirements of jobs. However, at the team level, content should focus on those capabilities that enable the team members to be integrated. Tannenbaum et al. suggest that “the unique aspects of the team context (e.g., task interdependence) present different challenges and opportunities than those which exist when training individuals” (p. 516). In addition, interpersonal demands are greater within a team environment; therefore, team members need training in areas such as communication, collaborative problem solving, and conflict management in order to work more effectively with their peers (Stevens & Campion, 1994). In other words, individuals working in a team environment require higher skill levels than
individuals working independently due to the need for stronger interpersonal and group decision-making skills in a team setting (Lawler, 1992).

Need for Team Training

An informative national survey of managers identified training as a key factor in the success of work teams, and inadequate training the greatest hindrance to effective team performance (Stevens & Yarish, 1999). Many researchers have identified training as an important resource for teams. For example, Hall and Beyerlein (2000) reviewed the relevant team literature and found that performance development or training was frequently mentioned as a critical component of team effectiveness.

While team training has gained wide-spread acceptance and received considerable research attention (Davis, Gaddy, Turney, & Koonts, 1986; Dyer, 1984), the evidence in support of team training is mixed due to weak methodologies and other research limitations (Campion et al., 1993). Lack of adequate training has even been identified as one reason for team failure (Harrington-Mackin, 1994). Guion (1998) even indicated in his book on selection that training and development was more important than selection for effectively turning individuals into a team. He states that “it may be less important to form teams by selection than to train the members to function as a team once they are chosen” (Guion, p. 29).

Other researchers have also found a link between team training and performance. According to Mohrman et al., (1995), teams are empowered when they have the knowledge and skills (e.g., technical, business, interpersonal, organizational) required to contribute to team and business-unit performance. Research has shown that access to necessary training differentiates
high performance teams from other, less effective teams (Tannenbaum et al., 1992). Teams are slow to mature and may never become a productive group without necessary training (Shonk, 1992). Shonk reports that “involving people without ensuring that they have the proper training and skills to perform their newly acquired tasks is a quick route to many mistakes – and to the reinforcement of the doubters who said it wouldn’t work” (p. 49).

Stevens and Yarish (1999) provide additional support for the importance of team training. “If an organization is unable or unwilling to commit the resources needed for team training, success may well prove very elusive” (Stevens & Yarish, p. 155). They also state, "It is prudent to provide training designed to support effective work teams. Unfortunately, team training is all too often treated as a fad, designed without properly assessing how and where it is needed, and inadequately evaluated" (p. 126). Sundstrom (199b) argues that “it is doubtful whether an organization can succeed in moving to a team-based structure without at least some training” (p. 313).

Team Training Content

Salas, Cannon-Bowers, and colleagues are among the leading researchers on team training (e.g., Cannon-Bowers et al., 1993; Salas et al., 1997). They have embraced the idea that there are two distinct tracks of behavior that need to be addressed through team training: teamwork and taskwork skills (Cannon-Bowers et al.). Stevens and Yarish (1999) and Salas et al. also support the distinction between training needs that are task-related and those that are team-related. Taskwork skills are related to achievement of a task or mission, while teamwork skills are needed for team members to function effectively as a team (Cannon-Bowers et al.). The
content of a teamwork-related training program should focus on the particular requirements of
the work done by the team, to ensure that training resources are not misdirected or wasted.

In order to understand the teamwork skills necessary for effective team performance, we
must understand the specific knowledge, skills, and abilities (KSAs) that contribute to
individuals performing effectively as team members. Stevens and Yarish (1999) support the
classification of teamwork KSAs into two categories: interpersonal skills and self-management
skills, and Stevens and Campion (1994) identify two subcategories of self-management KSAs –
goal setting and performance management, and planning and task coordination. Having a clearly
defined mission or purpose is critical to team effectiveness, while team members also need to be
able to set challenging, but obtainable goals. Stevens and Campion state that “effective teams
have clear expectations for the tasks and roles of team members, and planning and control over
internal work processes is an element in some models of team effectiveness” (p. 516). More
detailed information about interpersonal skills is included in a later section of this thesis.

To identify the KSAs most important for team effectiveness, an informal content analysis
was conducted to determine the content areas that have received the most attention in the team
training literature. The content analysis was completed by counting the number of references to
each training content area included in the team training literature reviewed for this thesis. The
literature reviewed included the 57 titles (e.g., articles, chapters, books, etc.) listed in the
References section of this thesis. The number of references is defined as the number of titles that
mentioned each training content area at least once; only one reference per title was counted.
The results of this content analysis indicated the following content areas were found most often in the relevant literature: interpersonal, communication, decision-making, leadership, collaboration, technical, conflict resolution, shared mental models, performance management, and problem solving. However, many other topic areas were also mentioned, as indicated in Table 1. Since nine of the top ten content areas identified through the content analysis are focused on teamwork skills (only technical is task-related), the focus of this research is primarily on teamwork skills. Specifically, this thesis will focus mostly on the top three teamwork skills: interpersonal, communication, and decision-making, and test the hypothesis that training on communication skills, interpersonal skills, and decision-making will have stronger relationships with perceptions of team performance than other components of the Training Content sub-scale.

Before discussing the top three teamwork skills in detail, the other seven skills will be summarized, since they are also important for effective team performance.

Table 1

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<td>4. Leadership</td>
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<td>5. Coordination/cooperation/cohesion/collaboration</td>
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6. Technical 13 23%
7. Conflict resolution 11 19%
8. Shared mental models 11 19%
9. Performance management 11 19%
10. Problem solving 11 19%
11. Adaptability 10 18%
12. Compensatory (back-up) behavior 9 16%
13. Role negotiation/clarification 9 16%
14. Task performance/specific job skills 8 14%
15. Shared situational awareness 7 12%
16. Teamwork 7 12%
17. Facilitation 6 11%
18. Goal setting 6 11%
19. Introduction to teamwork/learning to be a team 5 9%
20. Learning (openness to learning) 5 9%
21. Listening 5 9%
22. Self-management (managing group dynamics/processes) 5 9%
23. Planning 5 9%
24. Clarify team goals/mission/objectives 4 7%
25. Team meetings 4 7%
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<td>40.</td>
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<td>Cue-strategy associations</td>
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Leadership skills are seen as an important component of team training by several team training researchers (e.g., Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Davis et al., 1986; Guion, 1998; Guzzo & Dickson, 1996; Hall & Beyerlein, 2000; Mohrman & Cohen, 1995; Shonk, 1992). Guion defines leadership as the ability to influence others, including “deflecting a group from an unproductive path, suggesting alternative courses, raising critical questions, evaluating the group’s options, planning, coordinating, monitoring progress, and giving useful feedback to others” (p. 154).

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<td>57. Versatility</td>
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Collaboration, along with similar skills such as coordination, cooperation, and cohesion, is identified as an important teamwork skill needing training attention (e.g., Cannon-Bowers, Tannenbaum et al., 1995; Kozlowski & Salas, 1997; McIntyre & Salas, 1995; Salas, Cannon-Bowers, & Blickensderfer, 1997; Salas et al., 1992; Stevens & Yarish, 1999; Swezey & Salas, 1992; Tannenbaum & Yukl, 1992). Swezey and Salas state that “coordination and cooperation are important for optimum team performance” (p. 237). It is also important for team members to integrate their activities, requiring coordination and synchronization skills. “The capacity to plan and coordinate tasks and information has been identified as an important determinant of team effectiveness. The required coordination among members should be stressed during team training” (Stevens & Campion, 1994, p. 516).

Technical skills are also an important contributor to team effectiveness (e.g., Campion et al., 1993; Guion, 1998; Katzenbach & Smith, 1993; Lawler, 1992; May & Schwoerer, 1994; Mohrman & Cohen, 1995; Mohrman et al., 1995; Shonk, 1992; Steel & Jennings, 1992; Sundstrom, 1999a). It is important for team members to keep their technical skills current in order to establish and maintain credibility with other team members (Mohrman et al.). However, it is not necessary for every team member to have all of the technical skills required for the tasks at hand. Rather, it is the team's skill mix and collective knowledge that is crucial.

Conflict resolution is another skill that is mentioned several times in the research on team training and performance (e.g., Davis et al., 1986; Hall & Beyerlein, 2000; Katzenbach & Smith, 1993; Mohrman & Cohen, 1995; Mohrman et al., 1995; Shonk, 1992; Stevens & Campion, 1994; Stevens & Yarish, 1999). Mohrman et al. expand on the importance of conflict resolution for
team effectiveness: "Conflict resolution skills may be at the center of what is required to work collaboratively in the lateral organization…What is required to successfully resolve conflicts is the ability to transcend differences, to develop a shared understanding, and to work for mutual solutions" (p. 251). Mohrman and Cohen indicate that "people with conflict-resolution skills know how to deal openly with their frustrations and grievances, listen and understand others’ feelings and complaints, work for solutions that are mutually advantageous, and reach agreements” (p. 385). Therefore, conflict resolution among team members is related to the team’s ability to make improvements. Stevens and Campion also indicate that many researchers have suggested the importance of managing and resolving conflicts as an important skill for team members to have. However, they report that a moderate level of conflict is needed for optimal team performance, since it allows teams to identify problems, develop solutions, and work through issues without alienating other team members.

Shared mental models have received significant attention in the team literature (e.g., Cannon-Bowers et al., 1993; Cannon-Bowers, Tannenbaum et al., 1995; Salas et al., 1992). Cannon-Bowers, Salas and colleagues have focused a lot of their research on shared mental models. In relation to taskwork and teamwork skills, Cannon-Bowers et al. (1993) indicate the importance of team members having shared mental models of the task and team. Shared mental models are defined as “knowledge structures held by members of a team that enable them to form accurate explanations and expectations for the task, and in turn, to coordinate their actions and adapt their behavior to demands of the task and other team members” (Cannon-Bowers et al., p. 228).
Performance management (including performance monitoring and feedback) is cited as an essential element of team training many times in the literature (e.g., Cannon-Bowers, Tannenbaum et al., 1995; Davis et al., 1986; Hall & Beyerlein, 2000; McIntyre & Salas, 1995; Salas et al., 1992; Stevens & Campion, 1994; Stevens & Yarish, 1999; Tannenbaum & Yukl, 1992). According to Stevens and Campion (1994), effective teams are aware of their own performance and progress toward goals and make appropriate adjustments as needed over time.

Problem solving is also identified by many team researchers as an important element of team training and performance (e.g., Davis et al., 1986; Guzzo & Dickson, 1996; Katzenbach & Smith, 1993; Mohrman et al., 1995; Shonk, 1992; Steel & Jennings, 1992; Stevens & Campion, 1994; Stevens & Yarish, 1999). Stevens and Campion indicate that teams place greater problem solving demands on members than occur for individuals. In a team atmosphere, “multiple perspectives are brought to bear which may improve the diagnosis, the range of solutions considered, and the likelihood that incorrect solutions will be differentiated from correct ones” (Stevens & Campion, p. 510). Therefore, teams usually outperform individuals because their performance is as good as the best member. However, team members need to be able to identify situations in which participative problem solving will be beneficial and use the proper degree and type of participation.

The next section discusses the three training content areas that were found most often in the literature reviewed for this thesis: interpersonal skills, communication skills and decision-making skills.
Interpersonal Skills. Most team researchers agree that strong interpersonal skills are required for effective teamwork (e.g., Cannon-Bowers, Tannenbaum et al., 1995; Katzenbach & Smith, 1993; Stevens & Yarish, 1999). The importance of interpersonal skills is also supported by the number of references to interpersonal skills identified through the content analysis conducted for this thesis. Katzenbach and Smith argue that interpersonal skills training is essential for developing teamwork KSAs, and Mohrman and Cohen (1995) state that “interpersonal skills are a necessity” for team effectiveness (p. 384).

Interpersonal skills appear to be an “umbrella” category for many of the other skills needed for effective team performance. Mohrman and Cohen (1995) identify communication, influence, collaboration, negotiation, and conflict resolution skills as elements of interpersonal skills. They state that “an individual needs to be able to communicate with others, listen to others, influence others, and so forth” (p. 384). Similarly, Guion (1998) defines interpersonal skills as “skills in gaining cooperation, resolving disputes, in understanding and caring about the feelings of others” (p. 154).

Katzenbach and Smith (1993) identify communication and constructive conflict resolution as contributing to interpersonal skills, while Stevens and Campion (1994) argue there are three subcategories of interpersonal KSAs needed for effective team performance – conflict resolution, collaborative problem solving, and communication. Stevens and Yarish (1999) agree on the importance of effective communication, collaboration, and conflict resolution for team success, but suggest team members also need additional skills, such as the ability to build rapport
with one another and engage in productive discussions, since interpersonal demands are so much greater for team members than individuals working in a more traditional work environment.

In their extensive research on teams, Mohrman et al. (1995) found that most team building programs offered by companies emphasize the development of interpersonal skills, since a team’s ability to perform effectively is influenced greatly by the team’s ability to communicate clearly, to listen, to express ideas and feelings freely, and to appropriately disagree and resolve conflict. Stevens and Yarish (1999) agree that the typical interpersonal skills focused on in team training are conflict management, communication and listening, and collaborative problem solving.

Stevens and Campion (1994) also support the importance of interpersonal skills for effective team performance. They state that “team effectiveness depends heavily on the ability of individual members to successfully manage interpersonal relations with one another” (p. 506). However, Salas et al. (1992) indicate that interpersonal skills training has received mixed research support. Sales et al. refer to conflicting findings from research conducted by Johnston and Briggs: one research study (see Johnston & Briggs, 1968) found interpersonal skills training contributed positively to team performance, while another study (see Briggs & Johnston, 1967) indicated that interpersonal skills training did not enhance team performance. The research conducted for this thesis will look at the contribution of interpersonal skills training for team performance, and hopefully shed some light on the effect that interpersonal skills training has on team performance.
**Communication Skills.** Communication skills are defined as the ability to effectively exchange ideas through two-way communication (Guion, 1998). Of the various types of interpersonal skills required for effective team performance, it appears (from the results of the content analysis conducted for this thesis) that communication has received the most attention in the literature on team training and performance. Further support of the importance of communication skills is provided by Cannon-Bowers, Tannenbaum et al. (1995) and Salas et al. (1992), who acknowledge the specific attention researchers have paid to communication skills as a requirement for effective teamwork. “Effective communication has long been known to influence important team processes and outcomes and it is an explicit component of many current models of work team performance” (Stevens & Campion, 1994, p. 511). Swezey and Salas (1992) boldly state that “any training program which purports to address the issue of teamwork or team performance must specifically address the issue of communication among team members” (p. 234).

Team members are able to interact more effectively with each other when they communicate appropriately (Davis et al., 1986). Effective team communication is typically characterized as informal, relaxed, comfortable, open and supportive (Stevens & Campion, 1994). Effective communication is behavior or event focused, rather than person-focused; is based on congruence between what the communicator feels and says (as indicated through consistency between nonverbal and verbal messages); validates individuals; is conjunctive rather than disjunctive (i.e., everyone has an opportunity to speak); and is owned, not disowned (in other words, the speaker takes responsibility for his/her statements and ideas) (Stevens &
Campion). In addition, effective teams engage in closed-loop communication, which means that team members check with each other to ensure their messages are received and understood (McIntyre, Morgan, Salas, & Glickman, 1988). Listening is another important component of effective communication and a distinguishing characteristic of effective teams (Stevens & Campion).

Although communication has received considerable attention in the literature, research on the importance of communication for team success is not conclusive. For example, Stout, Salas, and Fowlkes (1997) report that "research in the area of team communication has been plagued by mixed results, with some studies showing generally positive relationships between communication and team performance and some studies showing generally negative relationships" (p. 171). The research conducted for this thesis will hopefully provide some clarity regarding the relationship between communication skills training and team performance.

**Decision Making Skills.** Decision making skills have also received considerable attention in the literature on team training and performance. Guion (1998) defines decision-making skills as “skill in getting information, evaluating it, knowing when there is enough of it, creating sensible or even novel options, and evaluating options” (p. 153). Hall and Beyerlein (2000) and Mohrman and Cohen (1995) also agree that effective decision-making skills are important for teams. Mohrman and Cohen state that team members who can use systematic decision-making processes to make data-based decisions and consider the costs and benefits of alternative decisions will be better prepared to contribute to team and business unit success. In their research into knowledge-work teams, Mohrman et al. (1995) also concluded that teams that use
systematic decision-making processes are much more likely to be effective than teams that do not.

Teams need decision-making skills in order to make decisions about how to do work, deal with the issues that arise, and determine solutions to problems (Mohrman et al., 1995). Zsambok (1997) found that training team decision making (TDM) skills affects team outcome performance even in the absence of training to improve task skill proficiency. However, Cannon-Bowers and Salas (1997) warn that the goal of training should not be to train people to make the right decision, but to train them to make the decision right.

Tannenbaum et al. (1996) state that “decision-making is centrally important for effective team functioning. We need to design and develop team training interventions that allow team members to practice how to use task-relevant information (i.e., cues) for effective team decision-making” (p. 519). The research conducted for this thesis should shed some additional light on the relationship between training on decision making skills and team performance.

Team Training Strategies

According to Tannenbaum et al. (1996), team training strategies and tools enhance team effectiveness through their effect on individual characteristics and team processes. As with training content, an informal content analysis was conducted for purposes of this research study to determine the training strategies that are referenced most often in the team training literature. The content analysis was completed by counting the number of references to each training strategy included in the team training literature reviewed for this thesis. The literature reviewed included the 57 titles (e.g., articles, chapters, books, etc.) listed in the
References section of this thesis. The number of references is defined as the number of titles that mentioned each training content area at least once; only one reference per title was counted.

The top ten training strategies identified through this content analysis of the relevant literature are: on-the-job training/high fidelity context, training intact teams, including feedback with training, cross-training team members, providing training just-in-time, allowing opportunities for practice, conducting individual training before team training, providing ongoing training, including role play/simulation activities in training, and demonstrating effective and ineffective teamwork in training. (See Table 2 for the complete list of training strategies found through the content analysis of the team training literature.) More information on each of the top ten team training strategies is provided in the paragraphs that follow.

Table 2

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<tr>
<th>Training Strategy</th>
<th>No. References</th>
<th>% of Titles</th>
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<tr>
<td>1. Provide on-the-job training/use high fidelity context</td>
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<tr>
<td>2. Train intact team</td>
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<tr>
<td>3. Include feedback with training</td>
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<td>4. Provide cross-training</td>
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<td>5. Provide just-in-time training</td>
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<tr>
<td>6. Allow opportunities for practice</td>
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<td>7. Conduct individual training before team training</td>
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<tr>
<td>8.</td>
<td>Provide ongoing training</td>
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<tr>
<td>9.</td>
<td>Use role play/simulation activities</td>
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<td>10.</td>
<td>Demonstrate effective/ineffective teamwork</td>
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<td>11.</td>
<td>Customize training to group’s needs</td>
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<tr>
<td>12.</td>
<td>Training is needs-driven</td>
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<td>13.</td>
<td>Provide opportunities for reflection</td>
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<td>14.</td>
<td>Provide opportunities for informal learning</td>
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<td>15.</td>
<td>Develop action plans from feedback</td>
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<td>16.</td>
<td>Emphasize interaction</td>
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<td>17.</td>
<td>Use expert facilitator</td>
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<td>18.</td>
<td>Create friendly atmosphere</td>
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<td>19.</td>
<td>Incorporate social modeling</td>
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<td>20.</td>
<td>Provide opportunities to ask questions</td>
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<td>21.</td>
<td>Team members share experiences</td>
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<td>22.</td>
<td>Relate prior experience to new skills</td>
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<td>23.</td>
<td>Sequence training from less complex to more complex</td>
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<td>24.</td>
<td>Conduct training when work schedule permits</td>
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<td>25.</td>
<td>Training is practical</td>
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<td>26.</td>
<td>Training is self-directed</td>
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<td>27.</td>
<td>Training supports organizational goals</td>
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The literature on team training indicates the importance of providing realistic, high fidelity scenarios. For optimal effectiveness, team training should be conducted in a realistic context (Mohrman et al., 1995; Roberts, 1997; Salas & Cannon-Bowers, 1997; Tannenbaum et al., 1996) and allow opportunities for practice or practical application (Harrington-Mackin, 1994; Salas & Cannon-Bowers). “Realism in team training scenarios is important so that the team’s reactions will be typical of actual operation” (Davis et al., 1986, p. 15). Furthermore, high fidelity simulations are an effective means to provide interpositional knowledge to team members (Salas, Cannon-Bowers, & Blickensderfer, 1997) and are “especially important when teams must coordinate individual and subtask performance under stressful conditions” (Salas et al., 1992, p. 20).

According to relevant research, training intact teams increases the effectiveness of team training. Having the entire team participate in team training is recommended so that every member is involved in the training and has the opportunity to practice with the other team members (Davis et al., 1986; Dyer, 1984). Training intact teams is most important when teams are involved in long-term assignments, have relatively low turnover, and require high team coordination (Stevens & Yarish, 1999). However, Stevens and Yarish suggest that teams with high turnover and short team assignments may not benefit from training as an intact team. Orasanu and Salas (1993) state that “if we want teams to perform effectively as teams, they must be trained as teams” (p. 344). Other researchers who agree on the importance of training intact teams for certain types of teams include Cannon-Bowers, Tannenbaum et al. (1995); Kozlowski and Salas (1997); Mohrman et al. (1995); and Sundstrom (1999a).
Providing performance feedback to team members is another strategy that contributes to
effective team training. Salas et al. (1993) provide the following guidelines: “Feedback in a team
environment should 1) enable each team member to perform his/her individual task, 2)
demonstrate the contribution of an individual’s performance to the performance of other
members, and 3) demonstrate the contribution of an individual’s performance to the performance
of the team as a whole” (p. 98). To be effective, feedback should be timely and accurate (Salas &
Cannon-Bowers, 2000) and address all important aspects of team functioning (Dyer, 1984).
Effective feedback will help individuals maximize their performance on those aspects for which
they receive feedback (Dyer, 1984) and will contribute to effective transfer of learning (Salas &
Cannon-Bowers). Other researchers who suggest the importance of feedback in team training
settings include Cannon-Bowers, Tannenbaum et al. (1995); Harrington-Mackin (1994);
McIntyre et al. (1988); Prince and Salas (1999); Salas and Cannon-Bowers (1997); Salas,
Cannon-Bowers, and Johnston (1997); Salas et al. (1992); Swezey and Salas (1992); and
Tannenbaum et al. (1996).

The literature also indicates that team training is more effective when it is preceded by
individual training. Research generally suggests that team members benefit most from team
training when they have had the opportunity to develop individual task skills before participating
in team training (Dyer, 1984; Salas & Cannon-Bowers, 1997; Salas et al., 1993; Salas et al.,
1992). Individual skill mastery must be achieved before team members can devote sufficient
attention to the process skills that are required for optimal team performance (Kozlowski &
Salas, 1997). Furthermore, “if individual skills are not developed fully, the team may not be able
to perform the task successfully no matter how effective their team skills may be” (Salas et al., 1993, p. 98).

Team training, like individual training, is more effective when it is provided just-in-time. Training should be provided just prior to the time when knowledge and skills learned during training need to be applied (Shonk, 1992). Providing training just-in-time is considered a “best practice” by Sundstrom (1999a), since new skills are quickly forgotten if they are not put to practical use. Furthermore, having immediate opportunities to apply new knowledge and skills gained from training increases learning transfer (Shonk, 1992). Katzenbach and Smith (1993); Mohrman et al. (1995); and Roberts (1997) concur that training is more effective when provided in real time or just-in-time.

Team training is also more effective when it is provided on an ongoing basis, not just as a one-time event. Team training should be conducted periodically to increase long-term retention (Dyer, 1984) and should include ongoing assessment of requirements, needs, and deficiencies to continuously improve team effectiveness (Salas & Cannon-Bowers, 1997). Learning should take place continuously “as the team hones its skills, increases its performance, and experiences the euphoria of a well-oiled system” (Roberts, 1997, p. 20). Harrington-Mackin (1994); Lawler (1992); Shonk (1992); and Swezey and Salas (1992) also agree with the importance of ongoing training and continuous learning.

Several team training researchers (e.g., Cannon-Bowers, Tannenbaum et al., 1995; Salas & Cannon-Bowers, 2000; Salas et al., 1993; and Stevens & Yarish, 1999) indicate the importance of cross-training as a component of effective team training. “When an organization
places a strategic premium on the benefits derived through continuous improvement and creative
problem solving, a more systematic approach to cross-training and job rotation must be viewed
as a critical element in realigning training and development for teams” (Stevens & Yarish, p.
135). Cross-trained teams should be better able to coordinate without depending on overt
communication (Salas, Cannon-Bowers, & Blickensderfer, 1997), as well as nurture shared
knowledge among team members and create flexibility for team members to substitute for one
another as needed in response to differences in workload across members (Mohrman et al.,
1995). “Cross-training also gives employees a broader, system-wide perspective of their jobs and
increased capacity for innovative problem solving” (Stevens & Yarish, p.134). The appropriate
amount of cross-training for any specific team should be determined based on the need for
specialization, the comparability of skills, and the need for flexibility. At minimum, team
members need adequate understanding of their teammates’ skills and abilities to effectively
discuss issues and trade-offs as the team works to make decisions and resolve problems;
rotational assignments and other activities that allow for learning across disciplines will help
provide team members with this needed knowledge (Mohrman et al.). However, full cross-
training is impractical for some types of teams, such as knowledge work teams (Mohrman et al.)
and teams with highly specialized member roles (Stevens & Yarish, 1999).

Providing opportunities for practice, role-playing, and demonstrating effective and
ineffective teamwork are all considered to contribute to effective team training. Salas and
Cannon-Bowers (2000) suggest the importance of providing opportunities for guided practice to
support team training objectives, while Tannenbaum et al. (1996) stress the importance of
practicing skills in a realistic context. Other team training researchers (e.g., Cannon-Bowers, Tannenbaum et al., 1995; Harrington-Mackin, 1994; McIntyre et al., 1988; Salas et al., 1993; Salas, Cannon-Bowers, & Johnston, 1997) also agree that opportunities for practice are essential for effective team training. The importance of role-playing or simulation activities as part of team training is supported by Cannon-Bowers, Tannenbaum et al.; Davis et al. (1986); Salas et al. (1993); Sundstrom (1999a); and Swezey and Salas (1992). “The training environment should accurately simulate appropriate aspects of the operational setting and conditions. Training should adjust the extent to which it simulates actual conditions and environments in a way designed to facilitate learning” (Swezey & Salas, p. 226). In addition, Salas and Cannon-Bowers (1997); Salas, Cannon-Bowers, and Johnston; and Tannenbaum et al. suggest that demonstrating effective and ineffective teamwork is also an important element of team training.

The research conducted for this thesis will focus primarily on three of the top five strategies. The top five strategies that were found most often in the relevant literature are: on-the-job training/high fidelity context, training intact teams, including feedback with training, providing training just-in-time, and providing ongoing training. The survey data used for this research do not include data on training intact teams or including feedback with training. The research conducted for the purposes of this thesis, therefore, will focus on the other three top training strategies: on-the-job training/high fidelity context, just-in-time training, and ongoing training. Specifically, this research will test the hypothesis that on-the-job training, out of all the training strategies, will have the strongest relationship with perceptions of team performance, as well as the hypothesis that just-in-time training and ongoing training will also have stronger
relationships with perceptions of team performance than other items of the Training Strategies sub-scale.

**Training for Different Types of Teams**

Team training researchers, such as Stevens and Yarish (1999), stress the need to customize the training and development function to the specific type of team. Customization is important, since different types of teams have significantly different training needs (Stevens & Yarish, 1999), therefore training should focus on the team competencies identified for a specific type of team within an organization (Salas, Fowlkes, Stout, Milanovich, & Prince, 1999).

For example, production, service, and action teams with low turnover would benefit greatest from training as intact teams, while training for teams with high turnover or time-limited assignments (e.g., project or parallel teams) should focus on individuals’ acquisition of skills (Stevens & Yarish, 1999). Action teams, such as cockpit crews and military units, especially benefit from training as intact teams so they have opportunities to practice and simulate their key tasks (Sundstrom, 1999a). Production teams also greatly benefit from training as an intact team due to the teams’ expected longevity (Stevens & Yarish). Stevens and Yarish argue that “although there is a lack of systematic research addressing the question of whether or not it makes sense to train intact teams for their group processes and internal dynamics, experience seems to suggest that training whole teams makes sense for those with long-term assignments, relatively low turnover, and high within-team coordination requirements. High turnover of team members and short lived team assignments tend to eliminate the benefits of intact team training” (p. 139).
Cross-training and job rotation are types of training that can be very beneficial to some types of teams, but inappropriate for others. Production and service teams can benefit from cross-training and job rotation in order to learn different team members’ skills (Sundstrom, 1999b), but this type of training may not be appropriate for teams with highly specialized member roles such as knowledge teams (Stevens & Yarish, 1999), since knowledge workers require in-depth knowledge, which can be expensive to obtain (Mohrman et al., 1995). Cross-training or job rotation may also be impractical for action and performing teams, due to the amount of time required to attain mastery of team members’ specialized roles and skills (Sundstrom).

The amount of training needed for team effectiveness also varies by type of team. Training is key for production, management, and action teams (Sundstrom, 1999a). For a transition to production teams in an established workforce in which workers are unaccustomed to working in teams, training is needed to help workers obtain the knowledge and skills needed to successfully work as a team. Training is also vitally important to action teams in order for team members to maintain and develop their concerted skills. Service teams also benefit from training, so that team members can cover for each other when needed. In contrast, project and parallel teams require the least amount of team training (Sundstrom). Training is less beneficial for project teams, since these teams usually have a limited life span and are typically comprised of members with specialized expertise, while parallel teams require little training, since they are temporary, part-time and relatively independent of their company’s operations. Table 3 gives more detailed information about the different training needs for different types of teams. The research conducted for this thesis will test the hypothesis that the relationships between the
Training Support System scale and the overall measure of Perceptions of Team Performance vary by type of team. This research will also test the hypotheses that of the four types of teams, problem-solving teams will have the weakest relationship between the Training Support System and Perceptions of Team Performance, while performing teams will have the strongest relationship between the Training Support System and Perceptions of Team Performance.

Table 3

Training Needs for Different Types of Teams

<table>
<thead>
<tr>
<th>Type of team</th>
<th>Training needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production teams</td>
<td>Training requirements are extensive, including:</td>
</tr>
<tr>
<td></td>
<td>1. Training to acquire interpersonal and self-management KSAs</td>
</tr>
<tr>
<td></td>
<td>2. Cross-training of technical skills</td>
</tr>
<tr>
<td></td>
<td>3. Training on production and operations management basics</td>
</tr>
<tr>
<td></td>
<td>4. Benefit from training as intact team</td>
</tr>
<tr>
<td>Service teams</td>
<td>Training requirements are similar to those of production teams:</td>
</tr>
<tr>
<td></td>
<td>1. Training to develop and/or strengthen interpersonal and self-management KSAs</td>
</tr>
<tr>
<td></td>
<td>2. Benefit from training as intact team</td>
</tr>
<tr>
<td>Management teams</td>
<td>Training needs have special focus:</td>
</tr>
<tr>
<td></td>
<td>1. Strategic planning sessions</td>
</tr>
<tr>
<td></td>
<td>2. Training on how to operate effectively in an empowered</td>
</tr>
<tr>
<td>Environment</td>
<td>Project teams</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Training focuses on developing individual skills, and does not typically</td>
</tr>
<tr>
<td></td>
<td>involve training members as an intact team:</td>
</tr>
<tr>
<td></td>
<td>1. Training to develop transportable competencies of individual team members</td>
</tr>
<tr>
<td></td>
<td>2. Training to develop and/or strengthen interpersonal and self-management KSAs</td>
</tr>
<tr>
<td></td>
<td>3. Training to help team members manage internal team processes and dynamics</td>
</tr>
</tbody>
</table>

**Note.** Adapted from Stevens and Yarish (1999).

**Need for Additional Research**

Although team training researchers have made substantial progress in the last fifteen years, more research is still needed. Statements from various team training researchers are listed
in this section, to give a chronological overview of the evolution of team training research over the past twenty years and the ongoing need for additional research.

In 1984, Dyer concluded that “there are no comprehensive theories of team/small group behavior that have been developed systematically and tested empirically. Instead, most researchers have generated descriptive models that fail to specify the principles, postulates, and hypotheses about relationships among variables that are characteristic of theories or have developed miniature models and theories that focus only on certain aspects of team functioning” (p. 287). Furthermore, for the models that do exist, researchers have not applied these theories to the development of team training programs.

In 1986, Modrick stated that “teams are a pervasive and an increasingly important means of organizing our work, social activity, and recreation. Nonetheless, knowledge concerning their structure, operation, performance, and training has been chronically inadequate. There are few comprehensive, detailed, documented descriptions of team activities, no well-defined and articulated models of team structure and operation, and few accepted, reliable, and valid measures of team attributes or performance” (p. 130). Modrick came to the conclusion that “the state of the art in training is inadequate” (p. 160).

Sundstrom, DeMeuse, and Futrell argued in 1990, that “traditional among prescriptions for work team effectiveness are training and consultation on team tasks and interpersonal processes,” but little is known about the “appropriate content or design of team training programs” (p. 124).
In 1993, Campion et al. suggested that the evidence in support of team training at the
time was mixed, in part because methodologies were weak and most studies focused on process
outcomes rather than effectiveness. Orasanu and Salas (1993) indicated that “little is known
about what actually constitutes team training” (p. 343), while Cannon-Bowers et al. (1993)
agreed that relatively little is known about the nature of teamwork, how to train teams to perform
effectively, and how to manage team performance. In 1994, Stevens and Campion, argued that
research at the time indicated that teamwork KSAs can be trained, and that “the amount of
evidence for the effectiveness of this training appears positive despite the methodological
limitations that plague the research” (p. 521).

Cannon-Bowers, Tannenbaum et al. stated in 1995 that “when it comes to training teams,
little exists to guide human resource practitioners who must design training systems. In fact,
empirically based prescriptions, guidelines, and specifications are virtually nonexistent for team
training” (p. 333). McIntyre and Salas recommended in 1995 that scientists and practitioners
continue to build their understanding of how to successfully manage, train, and foster teamwork
in industries and organizations. They argued that, “although our understanding of teamwork is
richer now, several critical questions remain unanswered” (p. 40), such as:

1. What is the role of organizational context in fostering teamwork?

2. What is the role of coordination in teamwork?

3. Where should an organization place its resources with respect to training teams?

4. What specific training interventions can be developed to enhance team performance in
organizations? (McIntyre & Salas, pp. 40-41).
In 1997, while Salas, Cannon-Bowers, and Kozlowski marveled at the progress in training research with statements such as, “the science and practice of training in the late 20th century are dynamic, exciting, and rich, with new insights about the design, delivery, and evaluation of training interventions” (p. 358), other researchers highlighted the need for much more research. Zsambok (1997), for example, pointed to the need for much more data to understand team training and, more specifically, the need for “much greater understanding of team training approaches: their critical elements, their impact on team product or output, their cost compared to benefit, and the impact of post treatment factors on longevity” (p. 119). Salas and Cannon-Bowers (1997) reported that few researchers “have addressed which training strategies are needed to ensure team effectiveness” (p. 249) and “there is still a question of how team training should be structured and what makes up effective team training” (p. 257). Stout et al. made the following statements regarding the state of team training research in 1997: “Researchers are only beginning to understand what comprises effective team training” (p.171). “Given the importance of effective teamwork to team performance, it is critical to determine how to improve teamwork” (p. 171). “Although the importance of team training has become widely recognized, research is needed to more clearly understand what instructional strategies actually lead to enhanced teamwork and performance” (p. 169). “There is a lack of clear understanding of what the effective instructional strategies for enhancing teamwork are” (p. 169).

In 2001, Salas and Cannon-Bowers reviewed the training research literature from 1992 to January 2000, including the literature on team training research. He reported that the literature provides evidence that team training works, but pointed to the need for additional research to
better understand team training and how to make it as effective as possible, especially as organizations increasingly insist on achieving a high return on their training investment.

As evidenced throughout this review of the literature, significant progress has been made over the last fifteen years in the area of team training research. Salas, Cannon-Bowers and colleagues from the Naval Air Warfare Center Training Systems Division (NAWCTSD) have made substantial contributions to the state of research on team training, as have many of the other influential researchers who have been referenced throughout this literature review. However, additional research is still needed, especially related to the specific components of team training that contribute most to a team’s ability to perform effectively. The research conducted for this thesis will focus on identifying the components of team training that have the strongest relationship with team performance. This research will contribute to the knowledge on team training, as well as benefit practitioners, who often have limited training resources, by identifying how team training can have the greatest impact on team performance.

**Hypotheses**

The overall research question guiding the research for this thesis focuses on the specific components of team training that are most important for team performance, with the practical application of hopefully helping organizations identify where to place their team training resources to obtain the greatest return on their investment. The hypotheses that will be tested by this research are listed below.

**H1.** Training content has a stronger relationship with perceptions of team performance than training strategies.
H2. Individual perceptions of team access to training on communication skills, interpersonal skills, and decision-making skills have stronger relationships with perceptions of team performance than other components of the Training Content sub-scale (technical skills, problem-solving skills, redesigning work methods, company’s business, group meeting skills).

H3. Individual perceptions of team access to on-the-job training has a stronger relationship with perceptions of team performance than the other training strategies.

H4. After on-the-job training, individual perceptions of team access to just-in-time training and ongoing training have the next strongest relationships with perceptions of team performance out of the Training Strategies sub-scale.

H5. Relationships between the Training Support System and Perceptions of Team Performance vary by type of team.

Exploratory Hypotheses

H5a. Of the four types of teams, problem-solving teams have the weakest relationship between the Training Support System and Perceptions of Team Performance.

H5b. Of the four types of teams, performing teams have the strongest relationship between the Training Support System and Perceptions of Team Performance.
CHAPTER II

METHOD

The method that will be used for testing the aforementioned hypotheses is detailed in this chapter, which is broken into the following four sections: Participants, Instruments, Procedure, and Analysis.

Participants

Participants who completed the two instruments used in this research were 400 individuals from companies in the United States and Canada. Participants were recruited from a National Science Foundation (NSF) study; advertisements on the Center for the Study of Work Teams’ web page; and flyers handed out at the Center for the Study of Work Teams’ conferences. All participants were provided with a cover letter explaining the study, and gave their consent for inclusion in the study.

Instruments

Two surveys are used in this study: the Support Systems Survey (Hall, unpublished dissertation, 1998) and an adapted version of the Perceptions of Team Performance Survey (Beyerlein, unpublished survey, 1996). In addition to completing the two surveys, subjects were also asked to provide demographic information on themselves and their work groups.

Support Systems Survey. Hall (1998) developed this instrument to evaluate individual perceptions of organizational support for groups. The survey contains 135 items and 9 sub-scales, with each sub-scale containing 15 items. Each item includes two factors: an Importance
scale, which rates the subjects’ perceptions of the importance of the item for the group getting its work done, and a Presence scale, which represents the subjects’ perceptions of how well the item describes the group’s current work environment.

The support system sub-scales were identified through Hall’s extensive review of the literature, with eight of the nine sub-scale categories (group design, integration, executive manager and supervision systems, defining performance, training, performance review, and rewards systems) based on Mohrman et al.’s (1995) framework for team-based organizations. Based on his review of the literature, Hall added an additional category for information systems.

Hall identified a large list of potential survey items (approximately 700) from his extensive review of the literature, and grouped each item into one of the nine categories based on his assessment of each item’s content. An objective sorter removed redundant items to reduce the list to 245 items. Hall then asked six subject matter experts to rate each item in terms of its importance to team performance. The 15 items that received the highest ratings for each category were chosen for inclusion in the Support Systems Survey. Hall’s analysis of the survey indicates that all sub-scales have Chrombach’s Alpha above .80, which suggests high internal reliability for the items in each sub-scale. (See Appendix A for a complete list of items included in the Support Systems Survey.)

Hall’s analysis found that the Presence scale of the Training Support System sub-scale has an alpha coefficient of .95. For purposes of this thesis, the Training sub-scale was further divided into two sub-scales: Training Content and Training Strategies. These sub-scales will be
validated as part of the analysis conducted for this thesis. (See Appendix B for a list of the Support Systems Survey items included in the Training Content sub-scale and the Training Strategies sub-scale.)

**Perceptions of Team Performance Survey.** An adapted version of Beyerlein’s (unpublished survey, 1996) Perceptions of Team Performance Survey (PTP) was used to collect data on team performance. In creating the adapted version, Hall copied ten items directly from the original PTP, and added ten new items to measure additional performance constructs based on models of team effectiveness found in the literature. Hall conducted a factor analysis on the adapted PTP and found four factors: customer satisfaction, psychological effectiveness, team effectiveness, and resource utilization and development. Hall’s research found an alpha coefficient of .95 for the overall measure of team performance on the PTP (i.e., all items of the PTP). (See Appendix C for a list of items included in the adapted PTP.)

**Procedure**

The data used in this research study were collected for previous research from June, 1997 to March, 1998 (see Hall, unpublished dissertation, 1998). Companies interested in participating in the study were given a copy of the survey and explained participation requirements for receiving feedback reports. Subjects were asked to read a consent form and were informed that participation was voluntary. Team feedback reports were provided when a specified percentage of team members completed the survey. (See Appendix D for the consent form and requirements for receiving feedback reports.)
Analysis

Hypotheses 1-4 will be tested by running Pearson Correlation Coefficients on the Presence scale of the Training Support System item ratings and the overall measure of team performance from the PTP, and conducting a significance test between the correlations using Fisher’s R to Z procedure. Hypotheses 5, 5a and 5b will also be tested by running Pearson Correlation Coefficients on the overall training Presence scale rating and the overall measure of team performance from the PTP for each type of team, and then conducting a significance test between the correlations using Fisher’s R to Z procedure.
CHAPTER III

RESULTS

Hall (1998) computed descriptive statistics and reliability coefficients on the Training Support System Presence scale, the Perceptions of Team Performance (PTP) survey, and the four sub-scales of the PTP. The results of these analyses provide justification for the use of these scales for research purposes. See Table 4 for results of Hall’s analyses.

Table 4

<table>
<thead>
<tr>
<th>Scale</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Alpha</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Support System Presence Scale</td>
<td>384</td>
<td>45.79</td>
<td>11.43</td>
<td>.95*</td>
<td>15</td>
</tr>
<tr>
<td>Perceptions of Team Performance</td>
<td>320</td>
<td>.78</td>
<td>.13</td>
<td>.95**</td>
<td>20</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>356</td>
<td>.82</td>
<td>.12</td>
<td>.86*</td>
<td>5</td>
</tr>
<tr>
<td>Psychological Satisfaction</td>
<td>373</td>
<td>.70</td>
<td>.20</td>
<td>.83*</td>
<td>4</td>
</tr>
<tr>
<td>Resource Utilization and Development</td>
<td>340</td>
<td>.75</td>
<td>.16</td>
<td>.85*</td>
<td>6</td>
</tr>
<tr>
<td>Team Effectiveness</td>
<td>364</td>
<td>.81</td>
<td>.14</td>
<td>.88*</td>
<td>5</td>
</tr>
</tbody>
</table>


For purposes of this research study, the Training Support System scale was divided into two sub-scales based on the literature review conducted for this thesis: Training Content and Training Strategies. A content analysis of the relevant literature was completed by counting the
number of references to each training content topic and training strategy. (See Table 1 for the
effects of the content analysis of training content topics, and Table 2 for the content analysis of
training strategies.) The validation process conducted to support use of these sub-scales for
research purposes involved using the Bootstrap procedure. Bootstrapping involves randomly
dividing the sample into two groups, then generating regression weights over a large number of
replications with samples drawn with replacement from the data set (Tabachnick & Fidell, 2001).
This process helps avoid overfitting, which may occur when there are too many variables relative
to the sample size, and can lead to lack of generalizability of the analysis results. Validity of the
Training Content sub-scale was supported, since the R-square coefficients for both validation
groups were similar (.16 and .15) and the measure of R-square optimism was very low (.01). R-
\[\text{square optimism indicates the amount of bias detected in the scale, meaning the difference}\]
\[\text{between the estimated population value and the sample value. Since the R-square optimism score}\]
is low for the Training Content sub-scale, this means there is very little difference between the
values of the estimated population and the sample. These results indicate an unbiased and valid
relationship between the overall measure of Perceptions of Team Performance and the Training
Content sub-scale. Validity of the Training Strategies sub-scale was also supported, with similar
R-square coefficients for both validation groups (.20 and .19) and a low R-square optimism score
(.00128). See Table 5 for descriptive statistics and reliability coefficients for the Training
Content and Training Strategies sub-scales, and Table 6 for correlations between the Training
Support System Scale and its two sub-scales (Training Content and Training Strategies) and the
overall measure of Perceptions of Team Performance and its four sub-scales (Customer
Satisfaction, Psychological Satisfaction, Resource Utilization & Development, and Team Effectiveness. As evidenced in Table 6, all scales and sub-scales correlated significantly with each other.

Table 5

Descriptive Statistics and Reliability Coefficients for Training Content and Training Strategies

<table>
<thead>
<tr>
<th>Sub-scale</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Alpha</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Content</td>
<td>380</td>
<td>26.07</td>
<td>6.85</td>
<td>.92</td>
<td>8</td>
</tr>
<tr>
<td>Training Strategies</td>
<td>376</td>
<td>23.37</td>
<td>5.85</td>
<td>.89</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: K refers to number of items in sub-scale.

Table 6

Correlation Matrix for Training Scale and Sub-scales and PTP Scale and Sub-scales

<table>
<thead>
<tr>
<th></th>
<th>Training Scale</th>
<th>Training Content</th>
<th>Training Strategies</th>
<th>PTP</th>
<th>Cust Satisf</th>
<th>Psych Satisf</th>
<th>RUD</th>
<th>Team Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Scale</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training Content</td>
<td>.97**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training Strategies</td>
<td>.96**</td>
<td>.85**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTP</td>
<td>.44**</td>
<td>.40**</td>
<td>.45**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cust Satisf</td>
<td>.33**</td>
<td>.28**</td>
<td>.35**</td>
<td>.83**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psych Satisf</td>
<td>.49**</td>
<td>.47**</td>
<td>.48**</td>
<td>.82**</td>
<td>.51**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hypothesis 1 compared the strength of the relationship between Training Content and Perceptions of Team Performance to the relationship between Training Strategies and Perceptions of Team Performance. This hypothesis was analyzed through the Pearson Correlation Coefficient, and then by testing the significance between the correlations. The results of this analysis indicate a significant correlation between Training Content and overall Perceptions of Team Performance, $r(316) = .40, p < .001$, as well as a significant correlation between Training Strategies and overall Perceptions of Team Performance, $r(312) = .45, p < .001$. However, the hypothesis that Training Content would have a stronger relationship with overall Perceptions of Team Performance than Training Strategies was not supported, since the difference between the correlations was not statistically significant, $z = .68, p > .05$.

Hypothesis 2 examined the relationship between individual components of the Training Content sub-scale and Perceptions of Team Performance. All items of the Training Content sub-scale were found to have significant correlations with the overall measure of Perceptions of Team Performance at $p < .001$ (see Table 7 for descriptive statistics and correlations for items of the Training Content sub-scale.). However, the hypothesis that “my work group can easily get training on communication skills” (item 109), “my work group can easily get training on interpersonal skills” (item 124) and “my work group can easily get training on decision-making
“skills” (item 118) would have the strongest correlations with overall Perceptions of Team Performance was not supported, since the differences between the correlations were not statistically significant (see Table 8 for the results of this analysis).

Table 7

Descriptive Statistics and Correlations for Training Content Sub-scale Items

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Correlations with Overall PTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>34-Technical Skills</td>
<td>402</td>
<td>3.39</td>
<td>1.13</td>
<td>.29**</td>
</tr>
<tr>
<td>48-Problem-solving Skills</td>
<td>400</td>
<td>3.28</td>
<td>1.14</td>
<td>.34**</td>
</tr>
<tr>
<td>69-Redesigning Work Methods</td>
<td>391</td>
<td>2.95</td>
<td>1.07</td>
<td>.36**</td>
</tr>
<tr>
<td>109-Communication Skills</td>
<td>399</td>
<td>3.35</td>
<td>1.08</td>
<td>.30**</td>
</tr>
<tr>
<td>118-Decision-making Skills</td>
<td>396</td>
<td>3.20</td>
<td>1.05</td>
<td>.31**</td>
</tr>
<tr>
<td>119-Company’s Business</td>
<td>393</td>
<td>3.48</td>
<td>0.96</td>
<td>.24**</td>
</tr>
<tr>
<td>124-Interpersonal Skills</td>
<td>395</td>
<td>3.48</td>
<td>0.96</td>
<td>.31**</td>
</tr>
<tr>
<td>138-Group Meeting Skills</td>
<td>394</td>
<td>3.24</td>
<td>1.06</td>
<td>.34**</td>
</tr>
</tbody>
</table>

Note: ** p < .001, N = 323 to 330.
Table 8

Z Scores for Testing Differences between Correlations for Hypothesis 2

<table>
<thead>
<tr>
<th>Item</th>
<th>109 Communication Skills</th>
<th>118 Decision-making Skills</th>
<th>124 Interpersonal Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>34-Technical Skills</td>
<td>.20</td>
<td>.20</td>
<td>.34</td>
</tr>
<tr>
<td>48-Problem-solving Skills</td>
<td>-.50</td>
<td>-.50</td>
<td>-.36</td>
</tr>
<tr>
<td>69-Redesigning Work Methods</td>
<td>-.71</td>
<td>-.71</td>
<td>-.57</td>
</tr>
<tr>
<td>109-Communication Skills</td>
<td>–</td>
<td>0</td>
<td>.14</td>
</tr>
<tr>
<td>118-Decision-making Skills</td>
<td>0</td>
<td>–</td>
<td>.14</td>
</tr>
<tr>
<td>119-Company’s Business</td>
<td>.90</td>
<td>.90</td>
<td>1.03</td>
</tr>
<tr>
<td>124-Interpersonal Skills</td>
<td>-.14</td>
<td>-.14</td>
<td>–</td>
</tr>
<tr>
<td>138-Group Meeting Skills</td>
<td>-.42</td>
<td>-.42</td>
<td>-.28</td>
</tr>
</tbody>
</table>

Note: Bonferroni correction applied: \( p \) (.05) divided by number of tests (7), \( p = .007 \).

Hypothesis 3 explored the relationship between individual components of the Training Strategies sub-scale and Perceptions of Team Performance. All items of the Training Strategies sub-scale were found to have significant correlations with the overall measure of Perceptions of Team Performance at \( p < .001 \) (see Table 9 for descriptive statistics and correlations). However, the hypothesis that item 98, “my work group can easily get on-the-job training” would have a stronger relationship with the overall measure of Perceptions of Team Performance than the other training strategies was not supported, since the differences between the correlations for the Training Strategies sub-scale items were not statistically significant (see Table 10). For example,
the Training Strategies sub-scale item 147, “my work group gets training when we need it,” had the highest correlation with overall Perceptions of Team Performance, \( r (394) = .39 \), and item 125, “my work group determines its own training needs,” had the lowest correlation, \( r (395) = .29 \), but the difference between these two correlations was not statistically significant, \( z = 1.29, p > .05 \).

Table 9

Descriptive Statistics and Correlations for Training Strategies Sub-scale Items

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Correlations with Overall PTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-Informal Learning</td>
<td>392</td>
<td>3.42</td>
<td>0.96</td>
<td>.34**</td>
</tr>
<tr>
<td>66-High Quality Training</td>
<td>394</td>
<td>3.36</td>
<td>1.05</td>
<td>.35**</td>
</tr>
<tr>
<td>80-Experts Help Train Group</td>
<td>389</td>
<td>3.07</td>
<td>1.11</td>
<td>.31**</td>
</tr>
<tr>
<td>98-On-the-job Training</td>
<td>395</td>
<td>3.42</td>
<td>1.05</td>
<td>.34**</td>
</tr>
<tr>
<td>120-Ongoing Training</td>
<td>395</td>
<td>3.27</td>
<td>1.13</td>
<td>.38**</td>
</tr>
<tr>
<td>125-Group Determines Trng Needs</td>
<td>395</td>
<td>3.55</td>
<td>1.16</td>
<td>.29**</td>
</tr>
<tr>
<td>147-Just-in-time Training</td>
<td>394</td>
<td>3.22</td>
<td>1.10</td>
<td>.39**</td>
</tr>
</tbody>
</table>

Note: ** \( p < .001 \), N = 323 to 328.
Hypothesis 4 predicted that, after on-the-job training, item 147, “my work group gets training when we need it” (just-in-time training), and item 120, “my work group receives training as an ongoing part of the job,” would have the next strongest relationships with overall Perceptions of Team Performance as compared to the other items of the Training Strategies sub-scale. As with Hypothesis 3, this hypothesis was not supported, since the differences between the correlations were not statistically significant. (See Table 9 for descriptive statistics and correlations and Table 10 for the results of the tests of differences between the correlations.)

Hypothesis 5 examined the relationship between the Training Support System and overall Perceptions of Team Performance by type of team. The four types of teams are management
teams, problem solving teams, professional/technical support teams, and performing teams. Statistically significant relationships were found between the Training Support System scale, as well as the Training Content and Training Strategies sub-scales, and the overall measure of Perceptions of Team Performance and its four sub-scales for all types of teams with one exception (see Table 11 for descriptive statistics and Table 12 for correlations for all four types of teams). Training Content was not found to have a statistically significant relationship with the Customer Satisfaction sub-scale of the PTP for management teams, $r (67) = .24$, $p > .05$.

Hypothesis 5 was not supported, since the differences between correlations were not statistically significant (see Table 13). For example, performing teams had the lowest correlation with overall Perceptions of Team Performance, $r (93) = .39$, and management teams had the highest correlation, $r (59) = .49$, but the difference between these two correlations was not statistically significant, $z = -.77$, $p > .05$. Therefore Hypothesis 5a, which predicted that, of the four types of teams, problem-solving teams would have the weakest relationship between the Training Support System and overall Perceptions of Team Performance and Hypothesis 5b, which predicted that performing teams would have the strongest relationship between the Training Support System and overall Perceptions of Team Performance, were also not supported. However, additional analysis found a statistically significant difference between correlations for the Training Support System and the Resource Utilization and Development sub-scale of the PTP for management teams and professional/technical support teams, $z = 2.33$, $p = .02$. A statistically significant difference was also found between the correlations for the Training Content sub-scale of the Training Support System and the Resource Utilization and Development
sub-scale of the PTP for management teams and professional/technical support teams, \( z = 2.45, p = .01 \).

Table 11

Descriptive Statistics for Management Teams, Problem Solving Teams, Professional/Technical Support Teams, and Performing Teams

<table>
<thead>
<tr>
<th>Scale or Sub-scale</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management Teams</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training Support System</td>
<td>66</td>
<td>51.06</td>
<td>12.90</td>
</tr>
<tr>
<td>Training Content</td>
<td>68</td>
<td>27.72</td>
<td>7.22</td>
</tr>
<tr>
<td>Training Strategies</td>
<td>68</td>
<td>23.68</td>
<td>6.04</td>
</tr>
<tr>
<td>Perceptions of Team Performance</td>
<td>64</td>
<td>1468.70</td>
<td>344.56</td>
</tr>
<tr>
<td>Resource Utilization &amp; Development</td>
<td>64</td>
<td>427.31</td>
<td>112.80</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>67</td>
<td>376.24</td>
<td>94.27</td>
</tr>
<tr>
<td>Team Effectiveness</td>
<td>68</td>
<td>392.63</td>
<td>101.20</td>
</tr>
<tr>
<td>Psychological Satisfaction</td>
<td>68</td>
<td>276.10</td>
<td>77.28</td>
</tr>
<tr>
<td><strong>Problem Solving Teams</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training Support System</td>
<td>64</td>
<td>46.20</td>
<td>12.52</td>
</tr>
<tr>
<td>Training Content</td>
<td>68</td>
<td>24.49</td>
<td>6.63</td>
</tr>
<tr>
<td>Training Strategies</td>
<td>65</td>
<td>21.97</td>
<td>6.34</td>
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<td>Perceptions of Team Performance</td>
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<td>1502.79</td>
<td>265.33</td>
</tr>
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<td>Category</td>
<td>Value1</td>
<td>Value2</td>
<td>Value3</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Resource Utilization &amp; Development</td>
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<td>432.17</td>
<td>96.89</td>
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<tr>
<td>Customer Satisfaction</td>
<td>66</td>
<td>386.52</td>
<td>69.12</td>
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<tr>
<td>Team Effectiveness</td>
<td>67</td>
<td>392.01</td>
<td>80.95</td>
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<tr>
<td>Psychological Satisfaction</td>
<td>69</td>
<td>271.84</td>
<td>85.52</td>
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Professional/Technical Support Teams

<table>
<thead>
<tr>
<th>Category</th>
<th>Value1</th>
<th>Value2</th>
<th>Value3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Support System</td>
<td>118</td>
<td>50.69</td>
<td>11.63</td>
</tr>
<tr>
<td>Training Content</td>
<td>120</td>
<td>26.65</td>
<td>6.29</td>
</tr>
<tr>
<td>Training Strategies</td>
<td>119</td>
<td>23.94</td>
<td>5.78</td>
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<tr>
<td>Perceptions of Team Performance</td>
<td>105</td>
<td>1574.91</td>
<td>268.58</td>
</tr>
<tr>
<td>Resource Utilization &amp; Development</td>
<td>111</td>
<td>459.84</td>
<td>98.99</td>
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<tr>
<td>Customer Satisfaction</td>
<td>115</td>
<td>416.33</td>
<td>66.79</td>
</tr>
<tr>
<td>Team Effectiveness</td>
<td>118</td>
<td>404.75</td>
<td>77.08</td>
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<tr>
<td>Psychological Satisfaction</td>
<td>117</td>
<td>288.34</td>
<td>77.34</td>
</tr>
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</table>

Performing Teams

<table>
<thead>
<tr>
<th>Category</th>
<th>Value1</th>
<th>Value2</th>
<th>Value3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Support System</td>
<td>116</td>
<td>49.27</td>
<td>11.95</td>
</tr>
<tr>
<td>Training Content</td>
<td>118</td>
<td>25.63</td>
<td>7.09</td>
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<tr>
<td>Training Strategies</td>
<td>118</td>
<td>23.57</td>
<td>5.46</td>
</tr>
<tr>
<td>Perceptions of Team Performance</td>
<td>102</td>
<td>1565.58</td>
<td>266.23</td>
</tr>
<tr>
<td>Resource Utilization &amp; Development</td>
<td>109</td>
<td>445.93</td>
<td>95.15</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td>115</td>
<td>420.27</td>
<td>67.92</td>
</tr>
</tbody>
</table>
Table 12

Correlations for Management Teams, Problem Solving Teams, Professional/Technical Support Teams, and Performing Teams

<table>
<thead>
<tr>
<th>Scale or Sub-scale</th>
<th>Training Support System</th>
<th>Training Content</th>
<th>Training Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management Teams</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceptions of Team Performance</td>
<td><strong>.49</strong>*</td>
<td><strong>.49</strong>*</td>
<td><strong>.42</strong>*</td>
</tr>
<tr>
<td>Resource Utilization &amp; Development</td>
<td><strong>.56</strong>*</td>
<td><strong>.56</strong>*</td>
<td><strong>.49</strong>*</td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td><strong>.30</strong></td>
<td>.24</td>
<td>.27*</td>
</tr>
<tr>
<td>Team Effectiveness</td>
<td><strong>.43</strong>*</td>
<td><strong>.45</strong>*</td>
<td><strong>.36</strong></td>
</tr>
<tr>
<td>Psychological Satisfaction</td>
<td><strong>.43</strong></td>
<td><strong>.43</strong></td>
<td><strong>.33</strong></td>
</tr>
<tr>
<td><strong>Problem Solving Teams</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceptions of Team Performance</td>
<td><strong>.47</strong>*</td>
<td><strong>.45</strong>*</td>
<td><strong>.46</strong>*</td>
</tr>
<tr>
<td>Resource Utilization &amp; Development</td>
<td><strong>.39</strong></td>
<td><strong>.39</strong></td>
<td><strong>.37</strong></td>
</tr>
<tr>
<td>Customer Satisfaction</td>
<td><strong>.42</strong>*</td>
<td><strong>.40</strong>*</td>
<td><strong>.43</strong>*</td>
</tr>
<tr>
<td>Team Effectiveness</td>
<td><strong>.33</strong></td>
<td>.30*</td>
<td><strong>.33</strong></td>
</tr>
<tr>
<td>Psychological Satisfaction</td>
<td><strong>.44</strong>*</td>
<td><strong>.39</strong>*</td>
<td><strong>.43</strong>*</td>
</tr>
<tr>
<td><strong>Professional/Technical Support Teams</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 13

#### Z Scores for Testing Differences between Correlations for Hypothesis 5

<table>
<thead>
<tr>
<th>Type of Team</th>
<th>Problem Solving Teams</th>
<th>Performing Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Teams</td>
<td>-.10</td>
<td>-.77</td>
</tr>
<tr>
<td>Problem Solving Teams</td>
<td>–</td>
<td>-.62</td>
</tr>
<tr>
<td>Professional/Technical Support Teams</td>
<td>0</td>
<td>-.62</td>
</tr>
<tr>
<td>Performing Teams</td>
<td>.62</td>
<td>–</td>
</tr>
</tbody>
</table>

**Note:** Bonferroni correction applied: $p (.05)$ divided by number of tests (3), $p = .017$. 

Perceptions of Team Performance  
Resource Utilization & Development  
Customer Satisfaction  
Team Effectiveness  
Psychological Satisfaction

Performing Teams

| Perceptions of Team Performance | .39*** | .37*** | .44*** |
| Resource Utilization & Development | .31** | .30** | .33** |
| Customer Satisfaction | .27** | .28** | .30** |
| Team Effectiveness | .34*** | .33*** | .38*** |
| Psychological Satisfaction | .50*** | .47*** | .53*** |

**Note:** * $p < .05$. ** $p < .01$. *** $p \leq .001$. 

Table 13

Z Scores for Testing Differences between Correlations for Hypothesis 5
In summary, the results of the analyses conducted do not support the hypotheses set forth in this thesis. Possible reasons for the hypotheses not being supported are addressed in the Discussion section. However, a few interesting findings were uncovered in relation to team training for different types of teams. These findings will be explored in the Discussion section.
CHAPTER IV

DISCUSSION

Overview

The primary purpose of this research study was to examine the relationship between team training components and team performance, with the intent of filling a gap that currently exists in the team training research, as well as providing guidance to team training practitioners as to how to apply their oftentimes limited resources to have the greatest impact on team performance. Unfortunately, the limitations of this research study prevented results conclusive enough to be prescriptive for team training practitioners. However, the research is helpful in beginning to better understand the relationship between team training and team performance and pointing toward the need for additional research to help fill this gap in the research.

Hypothesis Testing

Hypothesis 1 predicted that training content would have a stronger relationship with perceptions of team performance than training strategies. Although both the Training Content and Training Strategies sub-scales were found to have statistically significant correlations with the overall measure of Perceptions of Team Performance, this hypothesis was not supported, since the difference between the correlations was not large enough to be significant. In other words, both training content and training strategies were found to be equally important contributors to team performance. The lack of support for this hypothesis could indicate that what teams are trained on and how they are trained are of equal importance for effective team
performance, or could be due to limitations of this research study. Additional research is needed in order to provide clarity in this area.

The analysis conducted to test Hypothesis 2 attempted to explore the relationship between specific training content topics and team performance. Based on a content analysis conducted to identify the training content topics discussed most often in the team training literature, it was hypothesized that communication skills, interpersonal skills, and decision-making skills would have stronger relationships with perceptions of team performance than other components of the Training Content sub-scale (technical skills, problem-solving skills, redesigning work methods, company’s business, and group meeting skills). Results of the analysis showed statistically significant correlations between each item of the Training Content sub-scale and the overall measure of Perceptions of Team Performance, indicating that all training content topics included in the sub-scale are important in contributing to effective team performance. However, the hypothesis that communication skills, interpersonal skills and decision-making skills would have the strongest relationships with team performance was not supported, since the differences between the correlations were not statistically significant. From these results, one could conclude that all of the training content topics included in the sub-scale are equally important for effective team performance, but a more likely conclusion is that the limitations of this research study prohibited detection of a significant difference between the correlations. Further research is needed to more definitively determine whether or not certain training content topics, such as communication skills, interpersonal skills and decision-making skills, are more important contributors to team performance.
Hypotheses 3 and 4 examined the relationship between the Training Strategies sub-scale items and the overall measure of Perceptions of Team Performance. Hypothesis 3 predicted that on-the-job training would have a stronger relationship with perceptions of team performance than the other training strategies, while Hypothesis 4 predicted that after on-the-job training, just-in-time training and ongoing training would have the next strongest relationships with perceptions of team performance. Results of the analysis found that each item of the Training Strategies sub-scale was significantly correlated with the overall measure of Perceptions of Team Performance, signifying that all of the different strategies for team training are important for effective team performance. However, as with Hypothesis 2, a significant difference between the correlations was not found, suggesting that all of the training strategies are equally important contributors to team performance. Again, the lack of statistically significant differences between the correlations is likely due to the limitations of the study; therefore further research is needed to better examine the relationship between training strategies and team performance.

Hypotheses 5, 5a, and 5b explored the relationship between the training support system and perceptions of team performance for four different types of teams: management teams, problem solving teams, professional/technical support teams, and performing teams. All four types of teams were found to have statistically significant correlations between the Training Support System Presence Scale and the overall measure of Perceptions of Team Performance. Although Hypotheses 5, 5a and 5b were not supported, since statistically significant differences were not found between the correlations, additional analysis examining the correlations between the Training Support System sub-scales (Training Content and Training Strategies) and the
overall measure of Perceptions of Team Performance and its four sub-scales (Resource Utilization & Development, Customer Satisfaction, Team Effectiveness and Psychological Satisfaction) for the four types of teams resulted in some interesting findings. First, all scales and sub-scales were found to have statistically significant correlations with each other for all types of teams with one exception: the Training Content sub-scale did not have a statistically significant correlation with the Customer Satisfaction sub-scale of the PTP for management teams. This finding suggests that customer satisfaction is not impacted when management teams receive training on the topics included in the Training Content sub-scale. The lack of a significant relationship between training content and customer satisfaction for management teams may be due to the degrees of separation between management teams and customers. In other words, there are many opportunities for the effect of training on management teams to be lost before reaching the end-user or customer. This is an interesting finding that should be studied further to achieve a better understanding of the relationship between training and customer satisfaction for management teams.

Two other interesting findings were found through the analysis of the relationship between team training and team performance for different types of teams. A statistically significant difference was found between the correlations for the Training Support System and the Resource Utilization and Development sub-scale of the PTP, as well as the Training Content sub-scale and the Resource Utilization and Development sub-scale, for management teams and professional/technical support teams. These results indicate that the training topics included in the Training Content sub-scale are more important contributors for management teams to make
effective use of their resources and improve their work processes than for professional/technical support teams. One theory to explain this surprising finding is that management teams have more control over their resources and work processes; therefore, they have greater opportunity to use their knowledge, skills and abilities obtained through training to impact their work resources and processes. Additional research is needed to test this theory, as well as obtain a better overall understanding of the relationship between training and team performance for different types of teams.

Limitations of the Study

Several limitations exist for this research study. The data used for this thesis were collected for previous research by Hall (1998). Hall reported the following limitations related to the data used in his research: all data came from a single survey, which may have resulted in inflated correlations; a large segment of the survey data came from one company, which may affect the generalizability of the results to teams within other companies; use of a more objective measure of team performance, rather than self-reported survey data which are highly subjective in nature, may contribute to different results; and the data were obtained using the original Support Systems Survey scales before factor analysis was conducted, so the factor analyzed scales may lead to differing results.

Additional limitations exist for the research conducted specifically for this thesis. The Training Support System scale does not include items related to training intact teams or including feedback with training, which were two of the training strategies referenced most often in the content analysis of the team training literature conducted for purposes of this thesis. In
addition, several analyses conducted for this research study are based on single items of the Training Support System with high inter-item reliability, which most likely contributed to the lack of statistically significant differences between the correlations analyzed to test the hypotheses.

Further Research

Several opportunities for further research have already been identified in the Discussion section. As indicated previously, additional research is needed to examine the relationship between the components of team training and team performance, given the limitations of this research study which contributed to the lack of statistically significant findings. Future research would be better suited to explore the relationship between team training and team performance by utilizing data collected specifically for this purpose. For example, a survey instrument should be developed to specifically assess the training content topics and training strategies identified most often through the content analysis conducted for this thesis. These data, analyzed in conjunction with a measure of team performance (such as the PTP or a more objective measure of team effectiveness), could then provide additional clarity around the relationship between team training and team performance, which could then be used by team training practitioners to identify how they can get the most impact from their training resources.
APPENDIX A

SUPPORT SYSTEMS SURVEY AND DEMOGRAPHIC QUESTIONS

(Hall, 1998)

Used with permission.
Directions

Circle your answer or mark your response in the space beside each question. Circle only one number for each question. If you work on multiple work groups, answer questions for the group you work on most often. Take short breaks if necessary. However, try to finish all surveys within a few hours. Use the current status of your group (how your group is now) when answering questions.

Date:_______________

Name:_______________

Work title:_______________

Address:____________________________________________________

City:_______________ State_______ Zip_______________

Phone:_______________

1. Sex: 1 = F 2 = M

2. Age_______________

3. Work group name:_______________

4. Department name:_______________

5. Business-unit name:_______________

6. Organization name:_______________

7. How many people do you supervise?_______________

7b. How many people are on your team?_______________

8. Does your organization consider you to work on a work team? 1. Yes 2. No
9. Do you consider yourself to work on a work team? 1. Yes 2. No

Supplementary Directions

If you answered Yes to question (8) or (9), consider yourself and these individuals as your work group. If you answered No to questions (8) and (9), consider the individuals who report to your direct supervisor as your work group.

10. Read the descriptions below and circle the number that best describes your work group:

1. High amounts of decision-making authority, rewards are based on group performance, jobs are broadly defined (members have many responsibilities).
2. Low amounts of decision-making authority, rewards are based on individual performance, jobs are narrowly defined (members have fewer responsibilities).

11a. How long do you think your work group will last?

1. A few months 2. About a year 3. Many years

11b. How many years has your work group existed?

1. Less than six months 2. Six months to a year
3. 1 to 3 years 4. More than 3 years

12. Who oversees the work of your group?

1. A supervisor or manager 2. A coach
3. Multiple supervisors, managers, or coaches 4. No one, we are autonomous

13. How many work groups does your supervisor/manager/coach oversee?


14. For the most part, does your group work in the same physical location?
1. Yes 2. No

15. How often does your group meet face-to-face?
   1. Daily  2. 1 or 2 times weekly  3. 1 or 2 times per month  
   4. 1 or 2 times per year

16. Do members of your work group rely heavily on computers and other electronic tools for communications with each other? 1. Yes 2. No

17. How often does your work group make significant work-related decisions?

18. What kinds of problems are discussed in your work group meetings?
   1. Technical 2. Interpersonal 3. Technical and interpersonal

19. For the most part, is your work group composed of individuals:
   1. From the same work function in your organization (such as all from welding or all from engineering?)
   2. From different functions in your organization (such as a mix from sales, engineering, and marketing?)
   3. From areas both inside and outside the company (such as a mix from sales, engineering, and external customers?)

20. Circle the number below that best describes the group you work on most often:
   1. Management group -- responsible for setting goals, overseeing projects, and making decisions
2 Problem-solving group -- solve specific short-term problems and/or perform specific short-term tasks
3 Professional or technical support group -- provide long-term assistance to others in the organization
4 Performing group -- make the product or provide the service offered by the organization

21. Which item best describes the work your group performs:

1 Production work -- work with tools and materials to create products; usually involves physical work; usually distant from the end customer; examples include welders, construction workers, and assembly line workers
2 White-collar (1): process large amounts of information; usually distant from the end customer and heavily computerized; examples include order processing and billing
3 White-collar (2): one-on-one encounters with customer; usually provide advice to meet customer needs; examples include lawyers, financial advisors, and sales representatives
4 White-collar (3): multiple individuals in organization provide services to customers; examples include hospitals and consulting groups
5 White-collar (4): multiple individuals in organization develop new products; work with other technical and/or service providers to create, share, and utilize ideas for solving problems or creating new services; examples include
multi-disciplinary project development work groups, engineering groups, and architectural groups

22. If you circled 5 -- white-collar (4) -- on the previous question, please circle the stage of development your group is currently in (otherwise, go on to the next question):

1 Discovery -- attempting to find knowledge and information about the project
2 Exploration -- analyzing or exploring possible solutions to the problem
3 Testing -- a pilot implementation of the possible solution
4 Implementation -- full scale implementation of the solution

23. Which item best describes your direct supervisor/coach/manager's relationship with your work group:

1 Makes decisions, sets goals, and gives job assignments
2 Gets employee input about decisions, goals, and job assignments, but makes final decisions
3 Gets input about decisions, goals, and job assignments and makes final
4 Allows employees to make decisions, set goals, and make job assignments

For the next three items, circle the number on the scale that best describes your group’s work:

24. Simple activities Complex activities
   1  2  3  4  5  6  7

25. Routine procedures Nonroutine procedures
   1  2  3  4  5  6  7

75
Directions

Below is a list of types of support work groups may need to achieve their goals. On the left and right sides of the list are two scales for rating the items in the list. On the left side, rate how well the item describes your work group. On the right side, rate how important that type of support is for getting your group's work done.

Rating Scale

1 = not at all.
2 = to a little extent.
3 = to some extent.
4 = to a great extent.
5 = to a very great extent.

26. Predictable outcomes

1 2 3 4 5

Uncertain outcomes

6 7

27. My work group can easily get information about our customers.

28. My work group makes many work-related decisions.

29. My company’s managers and executives develop systems that help my group share information.

30. When my work group meets performance review goals, we are paid more (or recognized).

31. My direct supervisor provides needed information to our group.

32. My group routinely coordinates work with other work groups.

33. My group has the “big picture” of how work flows through our company.
34. My work group can easily get training to help us develop new technical skills.
35. My direct supervisor sets goals collaboratively with our group.
36. My work group can easily collect, organize, and store information needed to perform our jobs.
37. Our group makes decisions to improve how work is done.
38. Pay for individual group members is based partly on individual performance.
40. My direct supervisor is a role model for our group.
41. Group members give each other regular, informal feedback.
42. My company uses multi-functional (cross-disciplinary) groups to integrate work.
43. Group members have the “big picture” of how work flows through the group.
44. My group works directly with customers.
45. Individual group members help set their individual goals.
46. Pay for individual group members is based partly on the company’s performance.
47. My company’s managers and executives see work groups as customers.
48. My work group can easily get training on problem-solving skills.
49. My company’s managers and executives develop goal-setting systems that help our group understand what work to perform.
50. My direct supervisor supports learning for our group.
51. My work group has meetings with other groups to share information.
52. My work group can easily get information from managers other than our direct supervisor.
53. My work group has regularly planned performance reviews.
54. My work group uses multiple performance measures.
55. My work group has the skills it needs to perform work well.
56. Pay for individual group members is based partly on our group’s performance.
57. Work group measurements are agreed upon by all group members.
58. My work group can easily get information on business-unit goals, strategies, and priorities.
59. Our group’s pay is based on actual performance.
60. To track group goals, my group uses specific performance measurements.
61. My group’s goals are aligned with other groups’ goals.
62. My work group’s pay system is fair.
63. My company’s managers and executives expect work groups to succeed.
64. My work group uses its goals to guide decision-making.
65. My work group has easy access to informal learning opportunities.
66. My group’s training opportunities are of high quality.
67. My company’s managers and executives are open to multiple perspectives (such as different points of view).
68. After we get more responsibilities, our work group gets rewarded (or recognized) in a timely manner.
69. My work group can easily get training on redesigning our work methods (the way we perform work).
70. My company’s managers and executives make sure that my group understands our company’s vision and priorities.

71. My work group uses performance measurements that are easy to understand.

72. My work group can easily work with other groups or work areas.

73. My work group develops action plans from performance reviews.

74. My work group makes day-to-day decisions about how work is done.

75. Group members feel good about the measurements we use.

76. Individuals on my group try to learn from other group members.

77. My work group can easily determine when our purpose in the organization changes.

78. My company’s managers and executives make sure that different areas of the company work well together.

79. My direct supervisor uses specific measurements for our work group.

80. My group can easily get experts to help train our group.

81. Individuals on my group can easily learn new skills.

82. After achieving goals, my work group is paid (or is recognized) in a timely manner.

83. My group’s recognition program is fair.

84. My direct supervisor helps our group work directly with other groups.

85. My group can access experts from other work areas.

86. Our individual group members have clear priorities.

87. My work group formally evaluates our supervisors and/or managers.

88. My work group takes available resources into account when setting goals.
89. My group members have good people skills.

90. My work group can easily get information on our purpose in the organization.

91. My company’s managers and executives develop performance review systems that help my group understand how to perform work.

92. My company’s managers and executives align goals among different work areas.

93. My work group can easily get information about company goals, strategies, and priorities.

94. My work group has meetings to share information.

95. My company’s managers and executives involve unions in the development of work groups.

96. Individuals on my group are skilled at doing their work.

97. My work group has a performance review system like other work areas in the company.

98. My work group can easily get on-the-job training.

99. Pay for individual group members is based on actual performance.

100. Pay for my group is based on reaching specific goals.

101. My direct supervisor sees our group as a customer.

102. My direct supervisor is dedicated to meeting customer needs.

103. My group’s direct supervisor uses performance measurements that are easy to understand.

104. My work group has a goal-setting system like other work areas in the company.

105. My work group has a pay system like other work areas in the company.

106. My direct supervisor provides the time needed to meet group goals.

107. My direct supervisor involves the work group in decision-making.

108. My work group can easily share learnings (such as new knowledge) with other groups.
109. My work group can easily get training on communication skills.

110. My group and our direct supervisor use exactly the same group measurements.

111. My work group’s priorities are clear.

112. My company’s managers and executives are role models for groups.

113. My direct supervisor encourages our work group to set goals.

114. Individual group members can easily share learnings (such as new knowledge) with other group members.

115. My company’s managers and executives help provide work groups the resources they need to perform work.

116. Others who depend on my work group (such as customers or other groups) help set my group’s goals.

117. Others who depend on my work group (such as customers or other groups) evaluate my group’s performance.

118. My work group can easily get training on decision-making skills.

119. My work group can easily learn about the company’s business.

120. My work group receives training as an ongoing part of the job.

121. My direct supervisor provides timely feedback to our group.

122. My work group is involved in setting our group’s goals.

123. My work group rotates leadership roles.

124. My work group can easily get training on interpersonal skills.

125. My work group determines its own training needs.
126. My work group has a formal method for resolving conflicts (such as conflicts about work or conflicts between people).

127. My work group can easily get information from our direct supervisor.

128. My work group evaluates the support received from managers and supervisors.

129. My work group makes the time to set goals.

130. My work group has meetings with suppliers to share information.

131. My company’s managers and executives develop training systems that help my group perform work.

132. My group uses performance reviews as a way to improve performance.

133. My company’s managers and executives develop reward systems that motivate my group to perform work.

134. My group’s goals are aligned with company goals.

135. My company’s managers and executives are dedicated to meeting customer needs.

136. My direct supervisor expects our group to succeed.

137. My work group makes the time to change work processes (i.e., the way work gets done).

138. My work group can easily get training on group meeting skills.

139. My work group can easily get information on the quality of our work.

140. For our group, rewards depend more upon meeting group goals than individual goals.

141. My work group is responsible for tracking the quality of work.

142. My work group can easily access information on the scheduling of work.

143. Members of my group are aware of each others’ work commitments.
144. My work group gets more pay (or is recognized) for additional effort.

145. When work is complicated or changes a lot, our group selects someone to help us work together.

146. My direct supervisor encourages our group to evaluate its performance.

147. My work group gets training when we need it.

148. My work group uses measurements to improve performance.

149. My work group has the needed business knowledge (such as budgeting skills, planning skills, and goal-setting skills) to perform work well.

150. My work group has meetings with customers to share information.

151. My direct supervisor encourages our group to continuously improve work processes.

152. Individual group members have goals that require high-levels of performance.

153. My direct supervisor provides our group resources it needs.

154. My work group has goals that require high-levels of performance.

155. My work group gets informal rewards when we meet performance goals.

156. My work group’s goals are aligned with business-unit goals.

157. My work group is paid more (or is recognized) for improving work procedures.

158. My work group fixes quality errors.

159. Our individual group members’ goals are aligned with group goals.

160. My group can easily get information on how the group is meetings its goals.

161. Members of my group take responsibility for work.
APPENDIX B

SUPPORT SYSTEMS SURVEY

TRAINING CONTENT SUB-SCALE AND TRAINING STRATEGIES SUB-SCALE
Training Content Sub-Scale

34. My work group can easily get training to help us develop new technical skills.

48. My work group can easily get training on problem-solving skills.

69. My work group can easily get training on redesigning our work methods (the way we perform work).

109. My work group can easily get training on communication skills.

118. My work group can easily get training on decision-making skills.

119. My work group can easily learn about the company's business.

124. My work group can easily get training on interpersonal skills.

138. My work group can easily get training on group meeting skills.

Training Strategies Sub-Scale

65. My work group has easy access to informal learning opportunities.

66. My group's training opportunities are of high quality.

80. My group can easily get experts to help train our group.

98. My work group can easily get on-the-job training.

120. My work group receives training as an ongoing part of the job.

125. My work group determines its own training needs.

147. My work group gets training when we need it.
APPENDIX C

ADAPTED VERSION OF BEYERLEIN’S (1996)

PERCEPTION OF TEAM PERFORMANCE SCALE
Directions: Rate your work group on the basis of the following: If 100% means the best that you group can do with all its current resources, how well is it actually doing now (write a percentage ranging from 0% to 100% on the line after each statement).

1. Controlling costs: __________________________
2. Goal achievement: __________________________
3. Cycle time: __________________________
4. Quality of products: __________________________
5. Innovation: __________________________
6. Increased capacity: __________________________
7. Use of expertise on the team: __________________________
8. Customer satisfaction: __________________________
9. Quality of service to customers: __________________________
10. Responsiveness to customer requirements: __________________________
11. Desire to work with the team in the future: __________________________
12. I am more satisfied with the team than frustrated: __________________________
13. Problem-solving: __________________________
14. Decision-making: __________________________
15. We believe in our ability to perform our job.: __________________________
16. Increased sales.: __________________________
17. Your growth opportunities: __________________________
18. Trust in management: __________________________
19. Commitment to the organization: __________________________
20. Satisfaction with the job: __________________________
APPENDIX D

CONSENT FORM AND

REQUIREMENTS TO RECEIVE FEEDBACK REPORTS
Overview

Our Research Team invites you to participate in our investigation of work groups. Participation means completing several surveys, and if enough of your group participates, receiving a feedback report. We believe that work groups and collaborative work systems can greatly benefit organizations. Unfortunately, there have been few scientific studies to show how organizations can support effective work groups.

Intent of this Study

The following surveys were designed to: (1) assess opinions concerning organizational support for groups; (2) evaluate perceptions of group empowerment levels; and (3) assess opinions concerning group effectiveness. We also ask questions to understand how groups are structured and the environment in which work groups perform. This study is a new research component from the Center's study "Leadership of Technical and Professional Teams." The original study was partly funded by the National Science Foundation's program "Transformation to Quality Organizations."

Feedback Report Requirements

For groups to receive feedback reports, at least four individuals or a minimum of 60% of the group’s members -- which ever is more -- must complete the surveys. For example, a group with ten members must have six individuals complete the surveys to receive a report. In addition, if you have three or more groups that qualify for a group-level report, then an overall, composite report can be obtained. We can then compare group-level results with overall composite results. Finally, for each report, we require that one individual act as a liaison
between your group and our Research Team. That individual will distribute surveys to group members, return surveys to our Research Team, and distribute feedback reports.

**Research Team Rules**

Our first priority is to ensure the confidentiality of individuals’ survey responses -- your survey responses will never be given to the organization. Thus, so that no one individual’s responses are accidentally revealed in feedback reports, we require a minimum number of individuals to complete the surveys. Also, feedback results will be based on composite scores -- individual scores will be summarized into group scores and these results will be presented in feedback reports. We want this to be a positive experience for you and your organization. In the future, we hope your group will complete additional surveys from our Research Team.

Note that participation in any part of this investigation is voluntary. Individuals who agree to participate are free to withdraw from the study at any time without penalty, prejudice, or loss of benefits.

Return of your survey indicates willingness to participate in this project.

Please Return Surveys to:

Center for the Study of Work Teams
Department of Psychology
ATTN.: Support System Survey
P.O. Box 311280
Denton, TX  76203-1280
If you have any additional questions about the study, please call the project director, Michael Beyerlein, Associate Professor of Psychology, Christopher Hall, or John Adcock at (940) 565-3096. Thank you for your participation and time.
REFERENCES


