AN ABSTRACT OF THE THESIS OF

Corrine L. Gobeli for the degree of Doctor of Philosophy in Education presented on March 3, 1995. Title: Critical Design Factors for Effective Teamwork Training in the Workplace: A Survey of Training Professionals in Oregon

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Henry J. Sredl

Although teams are a common method of structuring work activities, there is still much concern over their effectiveness. The primary purpose of this study was to describe the current state of teamwork training in Oregon and to identify critical training design activities, situational barriers and demographic variables related to the perceived success of workplace teamwork training programs.

A self-administered questionnaire, based on the literature and a Delphi panel, was mailed to over 500 members of two professional training associations (The American Society for Training and Development and The National Society for Performance and Instruction) representing workplace trainers in Oregon. Of the 319 questionnaires returned, 134 indicated they provided teamwork training in the workplace.

Data analysis included computing descriptive statistics on the frequency with which respondents actually performed 61 design and delivery/facilitation activities, the importance they placed on these activities, and the barriers they faced. Factor analysis was used to reduce the

items, and correlational methods, including regression and ANOVA, were used to determine the relationships between derived factors and success and the relationship between demographic variables and success.

Descriptive analyses indicated that these respondents place highest priority on activities related to a systemic, yet traditional view of teams within an organization. They pay close attention to the potential impact of organizational variables, primarily management support and goal alignment; lesser attention to rewards. They place lower priority on items relating to the task and technology used by the team.

Respondents employ participative, problem-solving approaches, encouraging total, voluntary participation, and focus on clarifying individual responsibilities, team goals, and decision-making. Aspects of a systems approach to training (performance objectives, task and person analysis, and continuous evaluation) are among the less frequently performed activities.

According to this study, successful teamwork training programs are performance-based, utilize constructive feedback and address individual attributes. Dysfunctional management practices are negatively correlated with success. Management must define clearly what teamwork means and then model desired behaviors. Implications and recommendations for further research are also included.

Critical Design Factors For Effective Teamwork Training In The Workplace: A Survey Of Training Professionals In Oregon

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Corrine L. Gobeli

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APPROVED:

Redacted for Privacy

Major Professor, representing Education

Redacted for Privacy

Director, School of Education

Redacted for Privacy

Dean of the Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Corrine L. Gobeli, Author

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CHAPTER 1
INTRODUCTION

Background

Organizations in the United States are operating in increasingly turbulent and uncertain environments. Globalization of the economy and worldwide competition are creating pressures to improve quality, timeliness, and productivity while cutting costs (Coates, Jarratt, & Mahaffie, 1991; Zemke, 1987). Rapid and continual changes in technology, the move from craft-based to computer-mediated assembly, and from a goods-producing to an information-based economy are changing fundamentally work processes and the nature of jobs (Coates, et al., 1991; Sen, 1987). Demographic shifts are creating an increasingly diverse workforce and there is a growing skills gap as new entrants to the labor force, often women and minorities, lack basic functional workplace skills (Ferman, Hoyman, Cutcher-Gershenfeld, & Savoie, 1990; Offerman & Gowing, 1990; Zemke, 1987). At the same time, the workforce includes better educated workers who expect meaningful work as well as standard work benefits (Sen, 1987; Zemke, 1987).

Organizational Transformations

To survive and thrive in this new, uncertain environment, organizations are undertaking sweeping changes which are radically transforming the nature of the workplace. One common strategic decision

is to restructure, to change the way work is organized by downsizing, or by implementing less hierarchical structures with fewer layers of management and more dependence on team-based, collaborative decision making (Beer & Walton, 1990; Carnevale, 1991; Offerman & Gowing, 1990). Organizations are changing from traditional pyramidal structures to flatter, leaner forms, with problem solving and decision making delegated to the lowest possible level in efforts to become more flexible, adaptable, and competitive (Carnevale, 1991; Ferman, et al., 1990; Marshall & Tucker, 1992).

Oregon, a small, but rapidly growing state situated on the Pacific Rim, provides a microcosm of the environmental forces impacting organizations nationwide as well as approaches to meet the challenge. Formerly dependent on natural resources, the state's industrial base is diversifying into products and services that rely more heavily on skilled human resources. High technology is now the state's third largest industry sector. Other growing sectors include service industries, including tourism and hospitality.

In 1988, recognizing the tremendous forces changing the economy, Oregon began a long range strategic planning process involving hundreds of citizens statewide. To implement the recommendations from this effort, in 1989, the state legislature passed the Workforce 2000 Act, which linked economic development strategy, workforce training, vocational education and public/private partnerships. In 1991 the legislature established a benchmark using the adoption of high performance work organization practices as one way to measure the diversity and robustness of the state's

economy and to achieve the strategic vision of developing the "best workforce in the world" (Oregon Works, 1993, p. 7)

Team-based Structures

A cornerstone of the broad organizational transformations occuring nationwide and in Oregon are cooperative, collaborative work structures—work groups and teams. Work groups and work teams, which have long been recognized as a "fact of organizational life" (Jewell & Reitz, 1981), "the basic components composing organizations and the contexts within which workers work" (Cummings, 1981, p. 250), are now viewed as critical to effective organizational functioning (Peters & Waterman, 1982), and as essential management tools (Gersick, 1988), determining to a large part the effectiveness of the organization (Goodman, Ravlin, & Schminke, 1987). Success in Workplace 2000, it is predicted, will be the result of a new paradigm which values teamwork over individualism, partnerships over hierarchy (Byrne, 1992), and the collective, cooperative activity of groups of people (Carnevale, 1991; Kanter, 1983). Organizations which move to team-based structures to cope with competitive pressures do so in the belief and hope that teams will effectively draw on the skills and creativity of employees, and, thus, contribute to organizational productivity and profitability.

Teams can address important and complex tasks that require diverse knowledge, skills, and perspectives not possessed by a single individual (Hackman & Morris, 1975; Larson & Lofasto, 1991). Organizations using teams report increases in quality and productivity, reductions in operating costs, and faster response to technological change (Peters & Waterman, 1982; Wellins, Byham & Wilson, 1991). Oregon employers cite seven major

reasons for promoting teamwork: flexibility and adaptability of workers and work flow, reduced duplication and redundancy of work, empowerment of employees, efficiency and cost control, enhanced training and cross training opportunities, improved quality of products and services, and a way to share and enhance values and ownership of task (Oregon Works, 1993, p. 20).

Organizational decision makers expect that individual employees, as well the organization, will benefit from participation in teams. Teams are in line with new worker values and a way to attract and retain skilled employees (Wellins, et al, 1991) by providing employees more self expression and the opportunity to participate in meaningful decisions (Sen, 1987). Companies with team-based structures appear to confirm these beliefs, reporting reduced absenteeism, increased job satisfaction, commitment, and motivation among employees (Gordon, 1992; Orsburn, Moran, Musselwhite, & Zenger, 1990).

No longer are teams merely a fact of life; they are now part of an organization's strategic direction, expected to fulfill technological, political, and social concerns simultaneously (Cummings, 1981). A 1990 nationwide study of 862 executives reported that 26% of their organizations were using self-directed work teams in at least some parts of their organizations (Wellins & George, 1991). Training magazine ("Industry Report", 1994) reported that over 73% of the over 1000 companies surveyed had at least some employees working as members of a working group identified as a team. In Oregon, 43% of private employers and 52% of public employers reported formally implementing employee involvement programs.

Eighty-one percent of the private employers with employee involvement programs cited the use of self-directed teams (Oregon Works, 1993).

Nationwide, the use of work groups and teams is being likened to a revolution similar to that which occurred in the early 1900's when scientific management captured the minds of managers (Lee, 1990). This move to cooperative, collaborative work structures is, however, requiring significant changes in the jobs, roles, skills, and attitudes of the workforce. Technical expertise and individual competencies are no longer sufficient for effective job functioning (Stout, Carson & Salas, 1992). New skill sets are required to perform new jobs in new contexts.

Carnevale (1991) stated that the primary task for most new jobs will be "interacting with colleagues and customers" (p. 41). As employees at all levels of organizations interact more with others and become more involved in technical problem solving and decision making, more cognitively complex (Carnevale, 1991; Cohen, 1991), ambiguous (Sen, 1987), and fluid and dynamic (Eurich, 1990) sets of skills will become primary. Customer focus and the use of interdependent, flexible teams and collaborative structures will require "soft" skills, referred to in the literature as social skills, social competence, interpersonal skills or teamwork.

Statement of the Problem

To help individuals and teams learn and practice the new skills required for team-based structures, organizations turn to training. Training is often cited as a key component of success for the new team-based structures (Galagan, 1990) and lack of training as a significant reason for

their failures (Wellins, & George, 1991). To design and deliver teamwork training, workplace trainers rely on both experience and theory in three major areas: training design and delivery (process), the adult learner (learner), and teams and teamwork (content). Although all three areas have interested researchers and practitioners for decades, clear, integrative guidelines on how to design and facilitate opportunities for employees to learn and practice teamwork are lacking. Research on teamwork training interventions lags behind the use of teams in organizations (McCallum, Oser, Morgan & Salas, 1989; Modrick, 1986).

Workplace training remains a constantly evolving, dynamic process. incorporating ideas, concepts and techniques from diverse fields. Research and development in training practices and underlying theory have expanded greatly during the last few decades, but research results have not always been translated and communicated effectively to the practitioner (Latham, 1988). Typically, training methodologies and techniques were developed for individual learners and well-structured, often technical problems. Such methods often do not transfer to the ill-structured and messy problems of collective, coordinated performance in the workplace.

The adult as learner has also engaged the interest of practitioners and researchers. The most well-known statement about adults as learners, andragogy, as defined by Malcolm Knowles (1990), once proposed as the basis for an overall theory of learning is now considered to be more ideologically than empirically based. The search for a general theory of adult learning, although offering much promise, has been termed a search for Eldorado (Kidd, 1973), since the learning activities, learning styles,

experiences, personalities, and capabilities of adults vary so greatly (Brookfield, 1986).

The content of teamwork training is based on what is known about groups and group processes in the workplace. Work groups—their role in organizations, the factors that influence their performance and effectiveness, and the nature of interventions to improve their performance—have engaged the interest of researchers and practitioners since the 20's and 30's and the classic Hawthorne experiments (Dyer, 1987). But within this voluminous collection of data, the workplace trainer will find little direct guidance. After more than 50 years of research, the state of knowledge about groups and teams has been called "badly fragmented" (Levine & Moreland, 1990, p. 586), inadequate for the present need. A significant problem has been the lack of an integrated comprehensive, public, body of knowledge on what constitutes a team, the functions and tasks of teams, skills required to work in teams, and strategies and methods for enhancing team effectiveness (Modrick, 1986; Salas, Dickinson, Converse & Tannenbaum, 1992; Tannenbaum & Yukl, 1992).

Two major methods for approaching teamwork training are team building, an intervention grounded in the humanistic, organizational development tradition, and team training, a more behaviorist, traditional training intervention stemming primarily from work on military crews and units (Tannenbaum & Yukl, 1992). The literature on team building is inconclusive, the studies of interventions showing mixed results (Sundstrom, De Meuse, & Futrell, 1990). An extensive team training research program is occurring in the military and nuclear power industries (Salas, Blaiwes, Reynolds, Glickman & Morgan, 1985; Gaddy & Wachtel,

1992). It is not clear, however, to what extent the results from studies on highly interdependent, tactical teams in high-risk, high-stress, high-technology, command and control environments are generalizable to other contexts and teams.

There is, thus, little well-researched and effectively communicated guidance for the workplace trainer to assess team training needs, to design strategies and methods to enhance learning and transfer of team skills, and to evaluate the effectiveness of these training programs. For the long-term, what is needed is a broad-based, integrative, rigorous empirical research program on enhancing team effectiveness. A clearer understanding of the current state of teamwork training activities is a first step in this long-term effort.

Purpose of the Study

The purpose of this study was to describe the current state of teamwork training in Oregon, to identify those critical teamwork training design activities and corresponding factors that are actually incorporated into existing teamwork training programs, and to determine the relationships between their use and the success of teamwork training programs. The study also explored the relationships between identified barriers and individual demographic variables and the perceived levels of teamwork training success.

Research questions addressed were:

1. What activities do workplace trainers in the state of Oregon actually perform when designing and delivering/facilitating teamwork training (TWT)?
2. How do trainers rate the importance of these TWT activities?

3. What relationship, if any, exists between activities performed and their perceived importance?
4. What underlying factors, if any, describe the activities that workplace trainers actually perform when designing and delivering/facilitating TWT?
5. What barriers do workplace trainers face when designing and delivering teamwork training programs?
6. How do workplace trainers rate the success of their TWT?

Null hypotheses tested were:

H_1 There is no relationship between the perceived level of importance of teamwork training activities and the frequency with which trainers actually perform these activities.

H_2 There is no relationship between the critical design factors and the perceived levels of teamwork training success.

H_3 There is no relationship between the perceived barriers and the critical design factors.

H_4 There is no relationship between the perceived barriers and the perceived level of teamwork training success.

H_5 There is no interaction between the critical design factors and the barriers on the perceived levels of teamwork training success.

H_6 There are no relationships between demographic variables and the perceived levels of teamwork training success.

Significance of the Study

In 1989, the state of Oregon established a goal to move to high-performance workplaces (Oregon Shines, 1989), an organizational strategy characterized by collaborative work structures or teams. Moving to these

new structures may be difficult; over half of Oregon private employers reported skill deficiencies when implementing work teams (Oregon Works, 1993). Formal training is one performance strategy recommended to assist employees make the transition from traditional structures to collaborative structures.

Unfortunately, research in teamwork training has not kept up with practice. As indicated previously, the general training literature provides little guidance for the workplace trainer to assess team training needs, to design strategies and methods to enhance learning and transfer of team skills, and to evaluate the effectiveness of these training programs.

A limitation of much of the research on team building is the lack of data on what actually goes on prior to and during team building interventions (Tannenbaum, Beard & Salas, 1992). This descriptive study addressed part of this gap by describing the current state of teamwork training in Oregon. By focusing on a broad, comprehensive listing of individual teamwork training activities, this study began to identify tasks that trainers typically incorporate into successful training interventions. Information about what trainers actually do and what they believe it is important to do may give preliminary insight into their implicit views about teamwork training. These implicit views can be compared with the recommendations available from the literature to identify areas of convergence and areas for further study. Are there significant gaps between practice and research? What areas deserve further, in-depth study?

Anticipating potential problems or barriers is an essential part of any change effort. The problems trainers face when providing teamwork training, however, may be well beyond their control. If this study finds that

the barriers trainers face have a significant relationship to either the activities they perform or the success of the teamwork training program, then this finding has most significance for management by delineating conditions under their control that hinder the effective provision of teamwork training. Such potential problem areas would need to be addressed as part of any organizational change effort involving teamwork training.

How successful do trainers believe their teamwork training programs to be? Is there any evidence that the activities trainers perform are related to the success of the programs? Are other individual, demographic factors associated with reported levels of success? Answers to these questions could be used in the selection and training of teamwork training providers, the development of new training efforts or in the on-going revision of existing programs.

Definitions

The major terms used in this study are defined below.

Context: relevant features of the organization surrounding and having the potential to influence the work team. Context includes features such as people, structures, and culture and their interactions (Merriam & Caffarella, 1991; Sundstrom et al., 1990). These features and their influence are also referred to as organizational context (Sundstrom et al., 1990); job context (Rothwell & Kazanas, 1992) or the performance system (Rummler 1987).

Barriers: the practical limitations or boundary conditions under which an instructional designer or design team operates. Among the typical constraints are budget, time, expertise of staff, user/learner skills,

attitudes and expectations of managers, learners and instructional staff, facilities, equipment, supplies, and organizational characteristics (Briggs, 1977; Gustafson & Tillman, 1991; Hannum & Hansen, 1989).

Design: A creative problem-solving process to determine how training and learning outcomes will be accomplished. Design activities include adaptations that occur during deliver/facilitation to respond to the unique condition, needs, and interests of a particular team.

System: a set of parts that behave in a way that an observer has chosen to view as coordinated to accomplish one or more purposes (Wilson & Morren, 1990).

Systems Approach to Training: a systemic and systematic process with which to identify as goals what people need to know and do within a particular context, to set out to achieve those goals and to understand whether or not they have been achieved (based on Johnson & Foa, 1989).

Team: two or more people who commit to working together, interdependently, to achieve a common goal.

Teamwork skills: interpersonal, self-management, and task-oriented behaviors and skills necessary for effective team functioning. Generic teamwork skills, applicable to any type of team, include communication, feedback, conflict resolution, effective influence and leadership. Operational skills, specific to the type of team and task, include information exchange, information evaluation, coordination, performance feedback, collaborative problem solving, task assignment, performance direction, strategy development, goal setting, and decision making. Effective teamwork may also be enhanced by conceptual knowledge or understanding about group structure, roles, development and task and

interaction processes, organizational culture and mission, and diversity (based on Carnevale, Gainer, & Meltzer, 1991; Davis, Gaddy, Turney & Koontz, 1986; Stevens & Campion, 1994).

Teamwork Training: structured training and development activities which occur on the job or in classrooms to enhance team performance.

Training: the formal procedures which a company uses to facilitate employee's learning so that their resultant performance contributes to the attainment of both individual and company goals and objectives (McGehee & Thayer, 1961). This study will not differentiate between education, training, or development. "Training" will be used as an all-encompassing term.

Workplace: a formal organizational setting in which individuals and groups engage in instrumental activities to produce or deliver goods or services and where educational/learning activities are primarily a means to achieve organizational goals rather than an end in themselves (based on Neff, 1985; Darkenwald & Merriam, 1982).

CHAPTER II

LITERATURE REVIEW

Introduction

> The problems we select for solution and the way we formulate them depends more on our philosophy and world view than on our science and technology (Ackoff, (1974, p. 8).

To remain competitive in a dynamic, global environment, U.S. organizations are transforming themselves. For many, this transformation involves replacing traditional pyramidal structures characterized by command and control with flatter, leaner structures, emphasizing cooperation and collaboration. Work teams are the basic building blocks of these new organizational structures.

Although work groups and teams are an integral part of the contemporary workplace, they often fail to live up to expectations. Many teams operate below their potential (Druckman & Bjork, 1992; Leimbach, 1992; Senge, 1990), leading to problems of coordination and lost competitive opportunities (Miller, 1989). Team effectiveness is a critical issue at every plant attempting to move to high involvement structures (Lawler, 1992).

Less than expected team performance is attributed to process losses (Steiner, 1972), the lack of team work skills, and the inability to cooperate (Dertouzous, Lester, & Solow, 1989). Employers have reported that "students come out of school at all levels unprepared to work in teams and with few of the skills they need to resolve conflicts with one another" (Marshall & Tucker, 1992, p. 67). Over half of Oregon private employers

experienced skill deficiencies when implementing self-directed work teams (Oregon Works, 1993).

Reasons given for the lack of teamwork skills among employees are diverse, ranging from the failure of K – 12 (Berscheid, 1985) and post secondary institutions (Eurich, 1990; Drucker, 1992) to provide students the opportunity to acquire teamwork skills; our strong cultural emphasis on individualism and the tradition of conflict between labor and management, government, and industry (Carnevale, 1991); habits and attitudes developed from years of work in bureaucratic environments (Orsburn, et al., 1990); and the traditionally hierarchical nature of many major institutions in our society—the family, school, church, military and business (Witte, 1980). The result of these factors is a reliance on authority, power, and individualism as opposed to collaboration (Witte, 1980). Another reason is a common belief among managers and supervisors that teamwork will develop naturally from the experience of working together (Cannon-Bowers, Tannenbaum, Salas, & Converse, 1991).

Nevertheless, there is a long-standing interest in helping people to work together successfully. Within organizations a number of potential interventions may be implemented to enhance team effectiveness, including redesigning jobs or task systems, modifying rewards and incentives, installing new processes for recruiting and selecting team members or team leaders, and providing training (Hackman, 1987).

Formal training is an improvement strategy designed to enhance employees' skills and performance. This study focused on education and training processes designed to affect the knowledge, skills, and attitudes of team members so they work together more effectively to accomplish team

goals. How do we make sure that such training meets both employer and employee needs and expectations and that it makes a difference to team effectiveness, when, as indicated in Chapter 1, there is so little consensus as to what constitutes effective teamwork or how to design effective teamwork training programs?

This literature review will first introduce systems thinking, the overall world view used to address the problematic situation of teamwork training in the workplace. A systems perspective will be used to discuss workplace training; the systems approach to training; the adult learner, the participant in the training and learning experience; and teams, the subsystems within the larger organizational system which provide the basis for the content and the context of the training.

Systems Thinking

How we define, study, and interpret a problem depends to a large part on our values and world views (Ackoff, 1974; Checkland, 1981). The approach to the situation presented in this study is consistent with the view expressed over 30 years ago by McGehee and Thayer:

> Training, if it is to become an effective tool of management, must be a systematic, orderly procedure, constructively applied to solutions of organizational problems and attainments of organizational goals. It must consist of more than casual instruction of learners and haphazard utilization of techniques. It further requires that basic premises underlying training activities have foundation in fact. (1961, p. 22).

The systems approach appears useful in dealing with the complex problem of teamwork training in the workplace. Systems approaches have been

incorporated into both theory and practice in organization theory and management, training and education, and team development.

Originally developed in 1937 by a biologist, von Bertalanffy (1976), systems theory was conceived as a "working hypothesis" (p. 33), a way of dealing with "organized complexity...the interaction of a large but not infinite number of variables" (p. 31). This alternative to classical science's emphasis on reductionism and linear cause-effect relationships engaged social scientists who extended its concepts to human activities. Sociologists looked at "systems of relationships and the integration of parts and subsystems into a functional whole...in terms of structures, processes, and functions;" anthropologists considered customs, behaviors, and institutions in relation to total culture; and psychologists focused on the individual within a sociocultural milieu (Kast & Rosenzweig, 1976, p. 16).

Systems concepts gained credence as a conceptual framework for the study of organizations during the 60's. Katz and Kahn (1978) presented a comprehensive model of organizations, integrating psychological and sociological principles. Critics of the concept, however, complained that it was too crude for meaningful research, too abstract for practice, and too complex to provide any meaningful prescriptions (Wren, 1979).

Nevertheless, system thinking continued, with systems approaches advocated in organizational development (French & Bell, 1984), the planning of change (Bennis, Benne & Chin, 1985), and education and training (Banathy, 1987; Goldstein, 1993; Romiszowski, 1981). Currently, systems thinking is experiencing a resurgence through the work of British researchers such as Checkland (1981) and American writers such as Ackoff (1974) and Senge (1990). Today, following von Bertalanffy (1976), systems

thinkers accept that constructs, systems included, are simply models or representations of some perspective of reality. New systems models recognize the existence of messy problems, multiple perspectives, and the need for adaptable, collaborative approaches. Contemporary systems methodologies provide a way of incorporating diverse viewpoints to think about human problem situations, and to generate feasible alternatives for improvement (Banathy, 1987; Checkland, 1981).

Basic concepts of systems thinking formed the world view of this study and framed the discussion of workplace training, the adult learner and teams, teamwork, and teamwork training.

Workplace Training

Training, formal procedures designed to improve job performance, has been a critical part of the workplace for thousands of years (Miller, 1987). Students of the philosophy and purpose of education for adults typically classify training that occurs in workplaces as a unique form of adult education, utilitarian in nature (Beder, 1989). It is generally conceded that the primary purpose of such training is organizational development (Sonnenfeld & Ingols, 1986) or organizational effectiveness (Beder, 1989; Darkenwald & Merriam, 1982). Such training, focused on the strategic needs of the organization, contrasts with traditional adult education, which focuses on individual personal and intellectual development.

Training in the workplace is used to enhance employees' effectiveness in their current positions (Goldstein & Gilliam, 1990), to prepare employees for promotion, to retrain workers for significantly different jobs, and to re-socialize employees for new working relationships and environments (Miller, 1989; Sonnenfeld & Ingols, 1986). Training is

expected to meet organizational needs by contributing to productivity and to meet individual needs by enhancing employees' skills, competence and satisfaction.

The way in which training is carried out in organizations today is the result of historical developments in numerous and diverse disciplines: economics, psychology, management, communication, sociology, political science, education and the humanities (Johnson & Foa, 1989; Richey, 1986; Rothwell & Sredl, 1992). Table 2.1 summarizes key people, publications, and concepts in just three areas (education, psychology, and management) which have had lasting impacts on the nature and scope of workplace training.

Although the table assigns concepts and contributions by individuals to discrete categories (i.e. management), in reality, these contributors form a complex, interdisciplinary web. The truly influential concepts and theorists transcend one domain. Knowles, for example, although most often associated with traditional adult education, was an early student of National Training Laboratories (Knowles, 1984) and is frequently quoted in organizational development and team literature. Mager's (1984) performance-oriented books on instructional objectives are standard reference texts for both K – 12 educators and workplace trainers.

Possibly as a result of incorporating contributions from such diverse disciplines, workplace training exhibits diverse, co-existing world views with differing assumptions, methodologies and techniques.

Era	Education	Psychology	Management	Workplace/Training and Development
The early years	• cooperative education • rise of free public schools			• European-style apprenticeship systems • factory schools
The 20's and 30's Application of Scientific Approaches	• Thorndike (1912) applied scientific principles to study of learning • Bobbitt (1918) objective skill analysis • Tyler (1930's) carefully written objectives & assessment to refine curriculum	• Munsterberg (1912) human factors in the organization & application of learning research to training • Beginnings of industrial psychology	• F.W. Taylor (1911) scientific management, including careful selection and systematic training • Roethlisberger & Mayo (193) Hawthorne studies: rise of human relations approach, balance of social and technical perspectives	• World War I: "show, tell, do, check" method developed to train shipyard workers • Gov't provided trng programs for unemployed during depression
The 40's and 50's Dawn of Systems Approaches	• Bloom (1956) Taxonomy of Educational Objectives for the Cognitive Domain • large-scale curriculum development projects • programmed instruction	• Lewin, father of group dynamics(1943) group discussion facilitates change • Maslow (1954) holistic view of human nature • Skinner (1954) scientific principles applied to teaching-behavioral psychology	• Workshops at Bethel ME: set stage for organizational development and team building (1947) • human relations school of management thought	• World War II: Job Instruction Training • ASTD established (1945) • Psychologists, educators, work with military to apply systems concepts to training • Miller (1953) first systems approach to training
The 60's Rising Professionalism	• "ISD" coined at Michigan State University • Mager (1962) Preparing Objectives for Programmed Instruction • Banathy (1968) Instructional Systems • Gagné, (1965):The Conditions of Learning: different instructional designs for different learning outcomes	• Gagné (1962): "Principles of Military Training," called one of the most important papers ever published in the field of training and development	• Work group interests researchers • McGregor (1960) characteristics of effective work teams • Likert (1961) overlapping group structures • Blake & Mouton (1964) Managerial Grid • Team training research in military and universities	• McGehee & Thayer (1961): Training in Business and Industry • NSPI established 1962 • Training & Development Handbook (1967)

Table 2.1 (Continued)

Era	Education	Psychology	Management	Workplace/Training and Development
The 70's Alternative Approaches	• ISD models proliferate • Knowles(1973): The Adult Learner: A Neglected Species introduces andragogy, humanist approach to adult education	• Campbell (1971) Annual Review of Psychology recognizes training and development with first chapter • cognitive revolution	• Sorcher & Goldstein (1973) social learning theory applied to supervisory & management training	• Goldstein (1974): first edition of Training in Organizations
The 80's Environmental Challenges	• Knowles (1984): Andragogy in Action • cooperative learning	• practical intelligence: how people learn in everyday life	• Lawler (1986) high involvement workplaces • Japanese management techniques; quality mgmt • Peters & Waterman (1982) • the work group as a team recaptures interest	• computer-based training, interactive, multimedia • performance orientation
The 90's Training as a Strategic Choice	• school restructuring • outcomes-based education • constructivist/ISD debate	• situated cognition : context central to understanding cognition	• Made in America • Workforce 2000 • stronger linkages between education, business and training	• training linked to organizational strategy • business education partnerships • learning organizations • just-in-time training

Sources: Miller, 1987; Reiser, 1987; Rothwell & Sredl, 1992; Schrock, 1991; Seels, 1989; Wren, 1979

Some assert that the underlying theoretical orientations and practices are primarily behaviorist, (Howell & Cooke, 1989) while others acknowledge the incorporation of more humanistic orientations through organization development (Darkenwald & Merriam, 1982). In practice, workplace training is an eclectic, pragmatic blend of hard (exemplified by behaviorist) and soft (exemplified by humanist) approaches, borrowing concepts from behavioral, experiential, and achievement-based theories (Stephan, Mills, Pace & Ralphs, 1988).

In addition to diverse world views, changes in the environment have significantly affected all disciplines and thus, workplace training. During World War II, for example, the military engaged researchers from a variety of disciplines. Among those who tried out their theories and techniques for the war effort were Lewin, Gagné, and Blake and Mouton (French & Bell, 1984; Shrock, 1991; Wren, 1979). During the 50's and 60's the systems approaches used in the military were subsequently applied both to organizations and to school systems. In the 60's, Sputnik and the threat of losing a global technical race to the U.S.S.R. led to increased funding for innovative educational efforts, including the development of large-scale instructional design systems, systems which were applied to training problems in the workplace (Shrock, 1991). In the 1980's and 90's global competition, technology and demographic changes combined to turn attention to alternative ways of organizing and managing both corporations and educational institutions.

Interest in teams and participative management gained new vigor in the 80's and 90's as managers and educators studied Japanese management techniques and embraced more collaborative work structures.

Workplace training has also been characterized by an on-going tension between theory and practice. Thayer and McGehee discarded about 90% of what they read about training while researching their landmark 1961 book, Training in Business and Industry, because it was opinion, rather than well-documented research (Thayer, 1989). Ten years later, Campbell's review in the 1971 Annual Review of Psychology, painted a dismal picture of the field: "By and large, the training and development literature is voluminous, non empirical, non theoretical, poorly written and dull...faddish to an extreme" (p. 565).

Twenty years after Campbell's first review of the training and development literature, Tannenbaum and Yukl (1992) found a voluminous amount of practitioner literature, still prone to fads and often atheoretical. Like Campbell, they found that researchers often failed to study findings outside their disciplines. But they also found encouraging evidence of increased methodological rigor and integration across disciplines.

Part of the increasing integration may result from a growing recognition of the importance of workplace training. Workplace training, the "silent partner in the nation's learning enterprise" (Carnevale, 1986, p. 18), is the fastest growing area of practice in adult education today in the United States (Watkins, 1989). It is estimated that U.S. employers spend over $40 billion each year on formal training and about $180 billion on informal on-the-job training (Carnevale, et al, 1990). Training, in general, is increasingly viewed as essential to organizational performance (Lusterman, 1985) and to maintaining a competitive edge in the new global economy (Eurich, 1985; Rosow & Zager, 1988). Part of this belief is based on

recent analyses indicating that education and training on the job are some of the most powerful contributors to the improvement of both individual opportunity and organizational effectiveness (Carnevale & Johnson, 1989), and productivity (Campbell, 1989; Katzell & Guzzo, 1983).

Still, there is tremendous diversity and inconsistency in the training provided to employees. Commitment to training varies from industry to industry, and even within organizations (Lusterman, 1985). Factors related to the provision of training are company size (Carnevale & Gainer, 1989; Jackson, Schuler & Rivero, 1989; Lusterman, 1985); industry type, (Carnevale, & Gainer, 1989; Jackson, et al., 1989; Lusterman 1985; "Industry Report", 1994); category of employee (Carnevale & Gainer, 1989; Froiland, 1993; Jackson et al., 1989; Lusterman, 1985; Oregon Works, 1993); human resource strategy and policies (Sonnenfeld & Ingols, 1986; Useem, 1993); product life cycle (Schuler & Jackson, 1989); and management support or resistance (Useem, 1993).

Results of a statewide study of training practices in Oregon illustrated some of these differences. Of those surveyed, 92% of public, but only 66% of private employers provided formal training. More large firms (those with over 100 employees), provided formal training than mid-sized or small firms. Managers and administrators, who make up just 6% of Oregon's total employment, received both the most hours of training and the greatest variety of training, primarily interpersonal skills, safety and thinking/organizing skills. Production workers received primarily safety training. However, if safety training were not considered, 81% of private sector and 50% of public sector employees would not have received any significant training at all (Oregon Works, 1993).

The methods used to train employees further illustrate the diversity, inconsistency, and often atheoretical approaches to training. Training in the workplace of today retains some of its very earliest methods—unstructured, direct, one-to-one training from expert to novice on the job. It also incorporates more formal and structured one-to-one learning through apprenticeships and mentoring relationships. Workplace training has many similarities to traditional education, with corporate classrooms, course schedules and stand-up trainers. It also utilizes cutting-edge hardware and software technologies with distance learning, electronic performance support systems, and interactive individualized instruction (Eurich, 1990).

Some of the diversity and inconsistency within the world of workplace training may be traced to the diversity among those who design and deliver it. Although large organizations may have well–defined training departments with specialists in instructional design, media and delivery, line managers and other non-training specialists are frequently involved in both the planning and delivery of training (Lusterman, 1985). Organizations moving to team–based structures delegate some training responsibilities to team leaders (Wellins et. al 1991). Small organizations assign training responsibilities to employees in functions ranging from personnel to office management, from production to quality, hire outside consultants, or contract with local community colleges for training services (Feuer, 1988).

Watkins (1989) stated that "one of the critical issues of human resource development is the trainer's lack of prior training in the field"

(p. 423). Although the majority of workplace trainers are college-educated, only 8% of survey respondents reported having undergraduate or graduate degrees in HRD. Trainers reported degrees in education, business, communication and psychology (Lee, 1985). This lack of targeted training is largely due to the emerging nature of the field and the lack of professional programs (Rothwell & Sredl, 1992).

There is evidence of increasing professionalism, indicated by the growth of the two major training associations, the American Society for Training and Development and the National Society for Performance and Instruction (Goldstein, 1993); increasing pressure for the establishment of certification programs (Watkins, 1989); the development of competencies for best practices (Rothwell & Sredl, 1992), and the recruitment of training and development specialists (Lusterman, 1985).

Training in the workplace today is an amalgam of theory and practice taken from diverse disciplines: education, management, psychology, engineering and systems. It blends a variety of philosophical and theoretical views, primarily humanist, behaviorist, cognitivist, and systems views. And increasingly, organizations, at least larger ones, are moving from unstructured "follow Jo(e) around" methods to structured, systemic and systematic approaches to training and development (Bowsher, 1992; Eurich, 1985; Goldstein & Gilliam, 1990; Lusterman, 1985).

A Systems Approach to Training

Although more organizations are advocating and using systems approaches to training, there is still disagreement over exactly what a systems approach is, how it is implemented, and if it is the most appropriate methodology for enhancing workplace learning.

A myriad of terms including instructional technology, instructional design, instructional development, instructional systems design and the systems approach to training can all be found in current literature. Instructional systems design is more frequently used in education while a systems approach is more often used in workplace training. In this study the terms systems approach to training and instructional systems design (ISD) will be used interchangeably.

Definitions

Perhaps because of the eclectic nature of its development, there is no definitive definition of systems approaches to training. An early definition was proposed in 1968, by Banathy, who described ISD as:

> a self-correcting, logical process for the planning, development, and implementation of [instruction]. It provides a procedural framework within which the purpose of the system is first specified and then analyzed in order to find the best way to achieve it. On the basis of this analysis, the components that are most suitable to the successful performance of the system can be selected...Finally, continuous evaluation of the system...provides a basis for planned changes in improving economy and performance. (pp. 15 – 16).

This definition, focusing on educational systems, specifies the goal-oriented nature of ISD and the steps of the process, while emphasizing its iterative, self-correcting, rational aspects. There is also a strong sense of quality—the "best way," "most suitable," "successful performance."

Goldstein (1993), writing for trainers in organizational settings, offered a similar definition, while using a different term:

> *instructional technology* refers to the systematic development of programs in training and education. The systems approach to instruction emphasizes the specification of instructional objectives, precisely controlled learning experiences to achieve these objectives, criteria for performance and evaluative information (p. 17).

Reflecting a somewhat broader perspective than Banathy, Goldstein listed four additional characteristics of instructional technology: (1) the continual use of feedback to modify the system; (2) concern with the total system and the complex interaction of components of the system; (3) a research approach; (4) recognition that instructional systems are just one of many interacting systems within an organization.

Briggs, writing for educators in 1977, defined ISD as, "The entire process of analysis of learning needs and goals and the development of a delivery system to meet the need" (p. xx). He expanded the definition to include development of materials and tryout, revision and assessment. The definition used in this study was expressed in practitioner's terms: "a process with which to identify as goals what people need to know and do, to set out to achieve those goals, and to understand whether or when they have been achieved" (Johnson & Foa, 1989, p. 4).

Assumptions, Characteristics, and Strengths of Systems Approaches

The primary assumption behind systems approaches is that instruction and learning experiences that are designed systematically, taking into account the elements and interrelationships of the training and design systems, will enhance learning and that increased learning will positively affect performance. ISD, according to its advocates, will result in

effective, efficient and relevant instruction; that is, learners will learn and achieve more than under unplanned or haphazard approaches (Gustafson & Tillman, 1991; Richey, 1986).

According to proponents, ISD's key characteristics distinguish it from traditional approaches to instruction. These characteristics are asserted to be its strengths, the reasons to use systems approaches rather than intuitive, teacher- or content-based approaches to instruction. These characteristics, it must be stressed, apply to ISD in its ideal form, not necessarily to its implementation in the messy reality of organizational life.

ISD is systemic (Goldstein, 1993; Gustafson & Tillman, 1991; Hannum & Briggs, 1982). Systems-theory-based, ISD recognizes complex interactions among variables within both the learning and performance contexts. Training itself is a key functional subsystem, just one part of a total organizational system (Goldstein, 1993; Rummler, 1987). In the particular situation of this study, teams are also subsystems. The training system and the team each are organized, structured wholes with unique, interdependent, interacting elements. However, since each is a subsystem of the organization, each will be influenced by and may influence the larger organization.

ISD is also systematic (Gagné & Briggs, 1974; Gustafson, 1981). It provides a logical (Banathy, 1968), orderly, (Gustafson & Tillman, 1991), rational process and a procedural, conceptual and decision-making framework (Rosow & Zager, 1990; Schiffman, 1986) for trainers to follow when designing and developing instruction, especially for complex situations (Banathy, 1987). Focusing systematically on each step of the

design process, ISD helps break down what could be an overwhelming task into manageable steps.

ISD is needs-based and goal-oriented. It is consistent with a belief that the primary objective of training is to improve individual and organizational performance (Rummler, 1987). The ISD process begins with analysis to identify needs—of the organization, job, team, and individual—and results in a system to provide opportunities for learners to achieve desired goals (Branson & Grow, 1987; Briggs, Gustafson & Tillman, 1991; Goldstein, 1993; (McGehee & Thayer, 1961; Richey, 1986). Goals are typically stated as measurable, observable outcomes or objectives which are tied to performance, or what a learner actually needs to know or be able to do, in a specific context. This specification of performance-based outcomes is a cornerstone of ISD approaches.

ISD is learner-centered. The emphasis is not on what an expert knows and can teach, what content is in a text, or what has traditionally been taught, but on what learners need to know or be able to do to perform competently (Johnson & Foa, 1989; Branson & Grow, 1987) and on what they already know and can do (Dick & Carey, 1985; Gagné et al., 1992). The learner-centered concept goes beyond skills and knowledge, however. Learner-centered also means changing the roles of both the learner and instructor. Banathy (1968) asserted that traditional instruction is teacher or content centered; thus, the teacher is the primary actor and the students are reactors. ISD, with its goal of enhancing learning and performance, results in a situation where the learner is the primary actor and the instructor, a manager or facilitator of a learning experience.

ISD is problem and process-centered. The purpose of ISD is not to advocate a particular content or method such as programmed instruction, experiential learning, or role clarification, but to define the problem clearly, to create alternative solution strategies, and to evaluate, select, and implement the most appropriate solutions to facilitate learning in light of the performance and learning context, the objectives, and the learner (Branson & Grow, 1987; Johnson & Foa, 1989).

ISD is adaptive and flexible, applicable to any size or scope of project from a simple lesson plan to a complex curriculum project. Utilizing concepts from control-theory (Branson & Grow, 1987), ISD has deliberately built-in mechanisms to gather and analyze information about the system to modify it (Goldstein, 1993) for continuous improvement.

ISD is research-based. First, advocates believe that instruction should not be based on trial and error, experience, ideology, or gut intuition, but on what is known about how people learn (Goldstein, 1993; Johnson & Foa, 1989; Richey, 1986). Secondly, instructional materials and methods should be developed and revised through continuous, empirical testing and tryout (Gustafson & Tillman, 1991), localized to specific groups of learners and specific settings.

ISD is also supremely pragmatic (Richey, 1986; Branson & Grow, 1987). Recognizing that there is no one best way to enhance learning and performance, ISD encourages an eclectic approach, selecting techniques from various theoretical frameworks and applying them to specific parts of the instructional process (Bednar, Cunningham, Duffy & Perry, 1991). ISD practitioners recognize that there are significant gaps in the underlying knowledge base; thus, they supplement theory and research by common

sense, hunches, and real-world successful experiences (Briggs, 1982). ISD in application is at once art, craft and science.

Models: Implementing a Systems Approach to Training

The variation and creativity of systems approaches to training are exemplified by models of the process. The models represent an ideal, a vision of how one should approach a performance and learning problem. There is no agreed upon, all-purpose model (Branson & Grow, 1987; Johnson & Foa, 1989; Romiszowski, 1981), although a "bewildering array" (Andrews & Goodson, 1980) of models exists. Models have been developed for single lessons (Merrill; 1983), large scale development projects (Diamond, 1989; Hannum and Hansen, 1989), traditional classroom settings (Dick and Carey; 1985; Seels & Glasgow, 1990), adult education (Knowles, 1987), and organizations (Campbell, 1988; Goldstein, 1993; Rosenberg, 1982). Models have also been developed to supplement the standard ISD process. Keller's ARCS (attention, relevance, confidence and satisfaction) model (1983) and the Stiehl/Bessey model (1993), for example, address the affective, rather than the cognitive domain.

Models have proliferated for a number of reasons. Andrews and Goodson (1980) refer to the "not-invented-here syndrome" (p. 12) which motivates designers to create models unique to their particular situation rather than search for existing models (Logan, 1982). Gustafson (1981) reached a similar conclusion, stating that many models had never been subjected to rigorous testing. Indeed, some models have been used only once for a particular project. In addition, many models are primarily conceptual, presented without adequate documentation for

implementation and without evidence of effectiveness (Andrews & Goodson, 1980; Logan, 1982). As a result, readers question their feasibility and effectiveness.

Although ISD is touted as being research-based, there has been a lack of coordinated or cumulative research on instructional models, possibly because practitioners have been more interested in designing instruction than in validating models (Gustafson, 1981; Hannafin, 1986). In addition, it has been said that there are simply too many variables and too many possible interactions for the entire process to be validated with existing methodological techniques (Johnson & Foa, 1989).

Nevertheless, there are a number of commonalties across models. After reviewing 40 different ISD models, Andrews and Goodson (1980) identified 14 common tasks, generic across "differing purposes, emphases, origins, uses, and settings" (p. 13). Richey (1986) refined the list to six core elements. The generic ADDIE model, consisting of five basic elements—analysis, design, development, implementation and evaluation (Rosenberg, 1982; Seels & Glasgow, 1990)—was used for this study. The ADDIE model was used because it is perhaps the most well-known model among workplace trainers and it provided a simple, easy to understand, organizing framework. This model was also chosen for its flexibility and the belief that in reality, "ISD is far messier, more varied, and far more creative than any model of it" (Branson & Grow, 1987, p. 404).

As an organizing framework, the ADDIE model can incorporate more complex models and can be used to compare and contrast models, as illustrated by Table 2.2, which summarizes models from traditional ISD, the work place and adult education. As can be seen from this table, the

Model	Analyze	Design/Develop	Implement	Evaluate
Andrews & Goodson (1980)	• analyzing goals and subgoals for learning required • characterizing the learner population • assessing need, problem, occupation, competence or training requirements • describing the systems, environment and identifying constraints • considering alternative solutions	• formulating broad goals and detailed subgoals • sequencing goals and subgoals • formulating instructional strategy • selecting media • developing courseware • developing materials and procedures for installing the program		• developing pre- and post-tests • trying out and revising courseware • costing instructional programs
Rosenberg (1982)	• assess organization, learner and job needs • define performance requirements • identify course content	• design objectives • specify tests, materials, strategies • develop tests, materials, strategies	• consider instructor characteristics • consider training facilities	• conduct on-going evaluation • consider accuracy, completeness, reliability, validity, relevance, appropriateness of off data, designs, and activities
Richey (1986)	• determine learner needs	• determine goals and objectives • design /select delivery approaches	• install and maintain system	• construct assessment procedures • try out instructional system
Foshay, Silber, & Westgard (1986)	• conducting a needs assessment • assessing the relevant characteristics of learners • analyzing the characteristics of a work setting • performing job, task, and content analysis	• writing statements of performance • sequencing performance objectives • specifying instructional strategies • designing instructional materials		• developing performance measures • evaluating instruction
Knowles (1987)	• diagnosing learning needs	• translating learning needs into objectives • designing a pattern of learning experiences	• climate setting • managing a pattern of learning experiences,	• evaluating the extent to which the objectives have been achieved
Campbell (1988)	• analyzing goals and job design • determining training needs	• specifying training objectives • specifying training content, • specifying learning methods and learning media, • accounting for individual differences, • specifying the conditions of learning		• evaluating training outcomes

analysis and design/development phases of the models have received the most emphasis with implementation, the least attention.

The ADDIE model itself is typically depicted as a series of boxes in linear, process flow chart form, consistent with its engineering systems base. The graphic representation in this study (Figure 2.1), inspired by Banathy (1987) and soft systems concepts, was designed to represent an interactive process consisting of defined inter-related, overlapping and continuous sub processes, firmly embedded within a particular context. Evaluation was considered to be an integral, on-going process, manifested both in constant critical reflectivity and through specific activities occuring at definite points throughout the process.

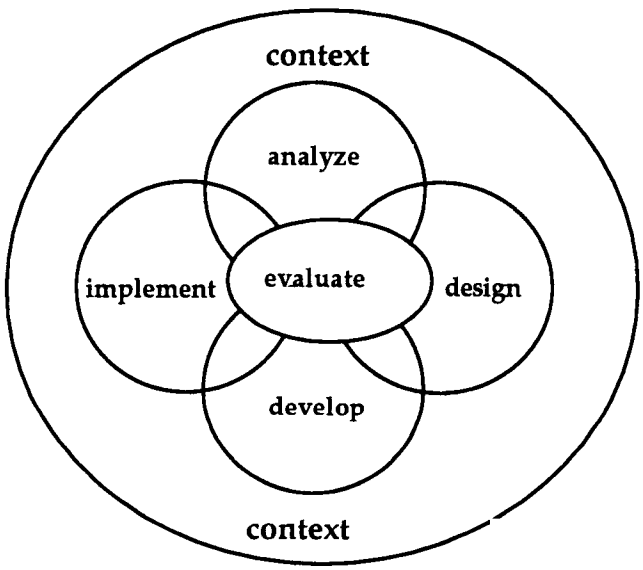


Figure 2.1 The Generic ADDIE Model

Brief summaries of the basic components of a systems approach to training follow.

Analysis.

The analysis phase sets the stage for all subsequent activities and choices. Analysis essentially identifies and clarifies the problem (Banathy, 1987; Rossett, 1987). In keeping with its systems-theory base, analysis includes identifying the system, its boundaries, components, and their inter-relationships. (Briggs, et al., 1991). Training needs are identified, based on analysis of desired or optimal goals and actual performance at different operational levels (Rossett, 1987). The operational levels typically analyzed, based on McGehee and Thayer's (1961) classic three level framework, are organization, job/task, and individual. Recognizing that organizations consist of subsystems with their own culture, goals, and strategies, Ostroff and Ford (1989) recommended an additional operational level, the subunit or team context.

Organizational analysis turns a macro lens on the organization, based on the belief that training needs and corporate strategies need to be linked (Latham, 1988). Current and future strategies and objectives, management support for training, resources, existing levels of productivity and any other contextual factors which might serve as supports or barriers to either the development or delivery of training and on-the-job performance are potential areas for exploration during this first part of the process (Goldstein, 1993; Rosenberg, 1982). Similar questions can be asked at the subunit level, considering the localized performance setting, climate, and situational constraints (Goldstein, 1993; Ostroff and Ford, 1989).

Job and task analysis describe the job that a trainee will perform after training. Task analysis has been termed "probably the most integral part of the instructional development process" as well as the "most ambiguous"

(Jonassen & Hannum, 1986, p. 2). Task analysis typically consists of five distinct activities: inventorying, describing, selecting, and sequencing tasks, and analyzing the knowledge, skills and attitudes required to perform the task (Jonassen & Hannum, 1986).

Person analysis focuses on the individual performer and identifies which employees need training, what type of training is needed, and what characteristics may affect the training design (Goldstein, 1993; McGehee and Thayer, 1961; Rosenberg, 1982).

Methodologies to conduct these analyses include direct observations, interviews, questionnaires, focus groups, review of archival data, critical incidents, and so on (Rossett, 1987; Zemke & Kramlinger, 1982).

In a systems approach, training is not automatically assumed to the most appropriate solution. Depending on the situation, alternative solutions to training such as job redesign, job aids, or modifications to reward systems are also considered. If training is the appropriate solution, resources and constraints in the performance environment of both the design team and the learner (Andrews & Goodson, 1980; Briggs, 1977; Davis Alexander, & Yelon, 1974; Goldstein, 1993) are further clarified. The outcomes of the analysis phase drive the remainder of the design process.

Continuous evaluation.

Although "E" for evaluation comes at the end of the acronym, evaluation is an on-going part of the systems model. Throughout a systems approach, designers reflect formally or informally, questioning the accuracy, reliability, completeness and interpretation of data, and the feasibility of their preferred solution (Rosenberg, 1982; Wilson & Morren, 1990). This emphasis on both feedback and feedforward creates an iterative,

self-correcting process (Banathy, 1987). The trainer not only reflects on the information already gathered, based on new data and experience, but looks forward, considering how new information and decisions might influence later stages of the process.

Design.

The design phase begins with writing performance objectives, based on the training needs, performance requirements and performance context identified in the analysis phase (Campbell, 1988; Gagné et al. 1992). Objectives may be stated as explicit behavioral statements defining exactly what learners will know or be able to do at the end of the training or as more general goals, defining the differences or accomplishments expected to result from the training.

Specifications are also drafted for instructional strategies, media and materials, implementation, and assessment. Two primary criteria exist for the selection of training methods. First, all methods and materials should be "consistent with the cognitive, physical, or psychomotor processes that lead to mastery" (Campbell, 1988, p. 198). Secondly, there should be a close correspondence between the training method and the desired performance objectives (Rothwell & Kazanas, 1992). General training principles, based on learning theory and training practice, have been advanced to achieve these two goals.

Although different learning theorists favor different instructional methods, certain principles seem to cut across theoretical orientations, as shown in Table 2.3. The design phase results in a training plan to serve as a blueprint or map for the rest of the design process.

Table 2.3 General Training Principles

Concept	Description	References
Congruence	Instructional events should be consistent with the desired performance.	Campbell, 1988; Gagné, et al., 1992; Tannenbaum & Yukl, 1992
Learner–centered	Individual differences, including motivation, interests, aptitudes, past experiences, and prior knowledge should be taken into account.	Campbell, 1988; Druckman & Bjork, 1991; Goldstein, 1993; Knowles, 1987; Tannenbaum & Yukl, 1992; van der Kamp, 1992
Relevance	Learning should occur in the context of specific, relevant problems.	Brown, et.al., 1989; Glaser & Bassock, 1989; Knowles, 1987; van der Kamp, 1992
Organization	Learning experiences should be thoughtfully organized, in a meaningful, logical sequence, (e.g. from simple to complex).	Gagné et al., 1992; Glaser & Bassock, 1989; van der Kamp, 1992
Modeling	Learners should be provided with explanations and modeling of appropriate performance strategies.	Brown et al., 1989; Glaser & Bassock, 1989; Goldstein, 1993; Latham, 1989
Practice	Learners should be actively involved, applying and practicing what they are learning.	Brown et al., 1989; Campbell, 1988; Gagné et al., 1992; Glaser & Bassock, 1989; Goldstein, 1993; Tannenbaum & Yukl, 1992; van der Kamp, 1992
Feedback	Learners should receive feedback that is timely, accurate, credible and constructive about their progress.	Campbell, 1988; Gagné et al., 1992; Goldstein, 1993; Tannenbaum & Yukl, 1992; van der Kamp, 1992
Engagement	The training process should engage learners' interests, be non threatening, and enhance their self–efficacy.	Campbell, 1988; Gagné et al., 1992; Tannenbaum & Yukl, 1992; van der Kamp, 1992

Development.

Development refers to the acquisition or production of media and materials for both trainees and instructors, according to the specifications outlined in the design phase (Rosenberg, 1982) This step may consist of selecting and possibly customizing packaged programs which meet specifications outlined in the design phase, hiring a consultant, or creating new and innovative activities and materials, relevant to the context and the learners. In keeping with the concept of continuous evaluation, methods and materials are reviewed by subject matter experts and learners and pilot tested in part or in whole before final production.

Implementation.

Implementation means actually conducting training or facilitating a learning experience. Many ISD models gloss over this step, apparently assuming that the trainer or facilitator is competent, training facilities are adequate, or that carefully crafted design and materials are sufficient. Goldstein (1993), Knowles (1987), and Rosenberg (1982), on the other hand, addressed the training environment including aspects of instructional quality, the role of the trainer, and characteristics of good trainers. It is during the implementation or delivery/facilitation phase that principles from the adult learning theorists relating to learning climate and the learner/instructor relationship are most applicable.

Evaluation.

As indicated earlier, evaluation occurs continuously throughout the ISD process. The primary purpose of on-going evaluation is to try out, to refine, and to improve the design process and the products, if any.

Evaluation during the design process relates to the reliability and validity of the data being collected, especially in terms of its relevance to the learners and feasibility for implementation (Goldstein, 1993, Rosenberg, 1982).

Evaluation also takes place during and after implementation to determine if performance objectives were met. Evaluation methods range from simple questionnaires assessing trainee satisfaction to rigorous experimental designs (Goldstein, 1993). A four-part model developed by Kirkpatrick (1976) has become the standard for workplace training evaluation. Did the trainees like the training? Did they learn; that is, did they attain the knowledge and skills they were supposed to attain? Did they apply these skills and knowledges on the job? What difference, if any, did it make to unit or overall organizational productivity? Questions remain about the nature of the relationships among the different levels. There is little empirical evidence, for example, that perceived enjoyment correlates with learning, performance, or results (Allliger & Janak, 1989; Dixon, 1990).

Limitations of Systems Approaches

Systems approaches to training have both strengths and limitations. What one person sees as a strength, another often views as a weakness. Some of the differences in perceptions stem from practical concerns about application and implementation of systems-based models and principles; others reflect profound philosophical differences about the nature of learning and the role of the instructor and the learner.

From a practical viewpoint, ISD models have been criticized as insensitive to constraints in the workplace, particularly time and cost (Lange & Grovdahl, 1989; Rothwell & Sredl, 1992; Wedman & Tessmer,

1991). They have been viewed as too narrow and simplistic (Johnson & Foa, 1989), overproceduralized (McCombs, 1986), mechanistic, reductionist, and linear (McCombs, 1986; Richey, 1986; Schiffman, 1986), and too abstract and idealized (Lange & Grovdahl, 1989). In some instances adherence to a standardized ISD process has come to be viewed as an "excruciatingly painful," mechanistic process rather than as a "continuous and flexible mental program development process" (Anderson, O'Neill & Baker, 1991, pp. 170 – 171).

It is asserted that systems models don't fit all settings or all learning problems. Developed primarily in military, technical, and classroom settings, existing models and procedures are not readily applicable to ill-structured, complex, learning problems, requiring analysis and synthesis (Johnson & Foa, 1989) and where objectives or goals can't be well-defined, agreed upon, or objectively measured (Briggs, 1982).

While ISD is said to be learner focused, the focus is said to be on a rather passive, individual learner, (Johnson & Foa, 1989), with packaged knowledge, being delivered to him/her. Such an approach, it is said, removes responsibility from the learner and creates a situation where education and learning are things that happen to him/her (Johnsen & Taylor, 1991). Humanist perspectives, considering the adult learner as a whole person are said to be ignored or inconsistent with fundamental assumptions and practices (Briggs, 1980; Hollis, 1991). ISD has also neglected the affective domain (Marsick, 1987; Martin & Briggs, 1990), an area where goals can't be well-defined and where performance is difficult to measure.

Little attention has been paid to the learner in group settings (Briggs, 1982; Rothwell & Sredl, 1992), to interactive or social skills (Romiszowski,

1981), or to methodologies for addressing future (Rothwell & Sredl, 1992), emergent, or learner-determined needs and goals (Briggs, 1982).

The pragmatic, eclectic nature of ISD, described previously as a strength, has also been seen as a weakness. Bednar et al. (1991) charged that ISD's tendency to abstract concepts and strategies from various theoretical frameworks strips them of meaning and leads to superficiality. In their view, theory and method are inextricably linked; effective instruction requires that a designer must deliberately apply methods and techniques true to a particular theory of learning.

The most contentious debate questions ISD's fundamental premises. Proponents of a theory of learning grounded in constructivist psychology have proposed a perspective on the nature of learning that has been called a major paradigm shift with far-reaching implications for practice (Jonassen, 1990).

Based on interdisciplinary qualitative research into how people learn through everyday activities, constructivist psychologists defined learning as not merely a change in the frequency or form of observable behavior as defined by the behaviorists (Latham, 1989) nor the acquisition or change in the internal representations of knowledge as defined by cognitive psychologists (Howell & Cooke, 1989), but as a process of actively constructing or creating meaning from experience (Bednar, et. al, 1991; Jonassen, 1990). Knowledge is not an objective, external reality that can be analyzed, reduced, sequenced and delivered to learners, but a subjective, individual interpretation based on direct experience, filtered by personal beliefs, motivations, conceptions of knowledge and past experiences (Jonassen, 1990; Kember & Murphy, 1990). Learning is an on-going process

as a person's conceptions change with additional experiences. Furthermore, learning and knowledge are "situated," embedded in context. Learning is also a social process, a means of entering a community of practice (Brown, Collins, & Duguid, 1989) where people share ways of talking, beliefs and practices as they work together. Although learning is said to be inherently social, according to these theorists there can be no ultimate shared reality since every person's experiences are unique and therefore constructions of meaning will differ. Nor can there be a correct meaning. Rather there will be multiple perspectives on every problem or situation (Bednar, et al., 1991; Kember & Murphy, 1990).

These "revolutionary" views of learning (Bednar, et al., 1991, p 98) imply significant changes in practice. Rather than identifying learner needs, painstakingly analyzing content, and creating packages of instruction (Bednar, et. al, 1991), constructivists espouse that educators select instances of "authentic activity...ordinary practices of the culture" (Brown, et. al 1989. p 34), and create opportunities for learning from experts and collaboratively with other learners. In other words, the task of the instructor is to select and create learning environments that present rich, complex, realistic, relevant whole tasks, with access to resources and tools so learners can explore, ask questions, collaborate with others, and define their own objectives in order to make sense out of what is happening (Brown, et al., 1989). The broad goal is to help the learner learn to think like a mathematician, artist, or team member. The role of the teacher is guide and coach rather than lecturer or teller; assessment is individualized and embedded within learning rather than being separate and criterion-referenced.

Systems Approaches in the Workplace

Evidence exists that a systems approach can lead to more effective and efficient instruction. Systems-designed courses have resulted in higher student achievement in less time with reduced training costs (Hannum & Hansen, 1989).

Nevertheless, there is confusion over exactly what a systems approach is and how it is actually practiced in the workplace. What is meant by a systems approach varies depending on the practitioner, the industry, and the size of the organization (Zemke, 1985).

One attempt to find out what workplace trainers actually do when designing training was completed by Training in 1985. A readership survey asked trainers to indicate the extent to which they actually performed specific tasks associated with a systems approach. The result was that although "something we can call a systematic approach...is alive and well in the field" (Zemke, 1985, p. 108), there was no single universal set of practices. Only 38% of survey respondents reported regularly conducting needs assessments; 36% conducted task analyses, and 24% formally assessed transfer of training to the job. On the other hand, 60% wrote behavioral objectives; 64% assessed learners entry skills; 87% modified training programs on the basis of test results and trainee feedback; and 65% measured trainee achievement at the end of training. Nevertheless, only 10.6% of respondents reported doing eight core elements regularly.

A 1989 survey of practicing instructional designers in the workplace and university professors (Lange and Grovdahl, 1989), revealed that academics tended to agree on specific indicators that distinguished a systematic approach to designing instruction from a conventional

approach. Practitioners neither shared this agreement nor implemented ISD models as prescribed; instead, they either adapted models to their particular situation or called whatever they did systematic design, regardless of the specific steps or activities undertaken.

According to a nationwide telephone survey of training managers ("Employee Training in America", 1986) about half of the 756 respondents said needs assessment was not done most or all of the time, with the frequency declining with the job level of the trainee, and only a little over half, mostly larger and more innovative companies, used formal evaluation methods. In a study of management training and development programs, only 27% of respondents from a sample of 611 companies with over 1000 employees typically conducted needs assessments, more often for first-level supervisors than for upper level managers (Saari, Johnson, McLaughlin, & Zimmerle, 1988). Oregon employers follow national trends. Training needs assessment and evaluation were among the least practiced of all measurement strategies (Oregon Works, 1993).

More optimistic results, at least for evaluation, were reported in Training's most recent Industry Report (1994). Based on Kirkpatrick's four-part model, over 83% of the over 1000 respondents reported evaluating reaction 66% tested learning, and 62% evaluated behavior changes, with 47% measuring changes in business resulting from to training. Data were not available as to the nature of these evaluation efforts.

Commonly cited reasons for the lack of systems approaches to training have been organizational constraints, primarily time, resources, and support (Clegg, 1987; Seels & Glasgow, 1990; Lange & Grovdahl, 1989). Wedman and Tessmer (1993) asked respondents to indicate which of six

common organizational constraints influenced their performance of activities. The three most frequent reasons for excluding activities were that decisions had already been made, the activity was considered unnecessary or there was not enough time. Least frequently mentioned reasons were lack of client support, money and expertise.

Barriers to evaluating training programs have differed somewhat. In addition to lack of time and resources, methodological difficulties and lack of staff expertise come into play. It is also difficult to determine if training leads to specific behavioral changes and if those changes affect organizational performance (Clegg, 1987; Goldstein, 1993; "To evaluate", 1994). Indeed, Knowles (1990) called evaluation the area of "greatest controversy and weakest technology in adult education and training" (p. 136).

Alternatives

Something that might be called ISD or a systems approach is used in the workplace. Apparently, however, the ideal models presented in the literature are not always implemented in practice. Where does this leave us? There is, undoubtedly, validity to the views of both advocates and critics. No matter what view one takes, one must still address the problem of creating opportunities for learning. One could discount ISD. The problem then becomes identifying alternatives. One alternative is to return to intuition, trial and error, and localized haphazard experience; another is to rely on the art of a master teacher/facilitator; another is to return to content-based instruction. One could also embrace the constructivist paradigm; however, one still needs guidance in defining, selecting, creating, and facilitating authentic experiences.

Another alternative, contrary to the views of those constructivists who decry eclecticism (Bednar, et al., 1991), is to embrace the concept of multiple perspectives, and to attempt to find common ground (Cole, 1992; Glaser & Bassock, 1989). This alternative, steeped in the world view of contemporary systems thinking, accepts that world views, theories, models, and methods are all merely representations of an ideal; hence, no single theory describes learning for all learners across all domains and in all contexts.

The debate between constructivists, cognitive and behavioral psychologists mirrors the centuries old epistemological debate over the nature of knowledge and knowing, between empiricism and rationalism (Checkland, 1981), between mastery learning and discovery learning (Glaser & Bassock, 1989). As McCombs (1986) stated, "Each paradigm presents a perspective that fosters selective perception of problems and procedures" (p. 13). While the debate is engaging from an academic standpoint, there is little time for drawn-out theoretical arguments in the messy, complex, pressured world of workplace trainers. Workplace trainers must provide opportunities for team members to enhance their ability to work together effectively, whether there are unified, comprehensive theories or not.

Given that there is still much to be learned about learning and the design of instruction and learning environments, the alternative in this study was to use a systems perspective, fully recognizing the limitations of traditional ISD models, as well as changes that have occurred in systems perspectives over the years. ISD models, rooted in hard systems theories and behaviorism, were modified to incorporate findings from cognitive psychology (Gagné, 1965). Supplementary models have been developed to

address affective issues and learner motivation (Keller, 1983; Martin & Briggs, 1990; Stiehl & Bessey, 1993) and situational constraints facing designers (Wedman & Tessmer, 1991).

Evolving ISD models are consistent with the new systems thinking espoused by Ackoff (1974), Checkland (1981), and Senge (1990). Banathy's (1987) new model, for instance, encourages thinking in terms of an ideal or vision; it recognizes the existence of context, pattern and structure within complex situations; it relies on data but encourages an interactive, participative team approach to ensure that different perspectives are engaged.

ISD, as used in this study, is more than the application of a single learning paradigm; it is the application of systems thinking to learning problems. ISD and the ADDIE model are viewed as organizing, question-raising, alternative-posing, learner-centered, creative design frameworks, a way of looking at the messy, complex, ill-structured problem of enhancing teamwork training in the workplace.

This approach is particularly relevant given the nature of the training and learning in this study: designing effective teamwork training programs. Teams are complex entities with a myriad of variables that can potentially influence performance. Applying a systems approach to teamwork training does not mean that a standardized packaged product, delivered in a classroom setting, will be the answer. Nor does it mean that a classical team building approach will always be used. A systems approach could result in a flexible set of generic guidelines, incorporating principles and techniques from various perspectives, capable of being customized to the needs of particular teams. It does, however, imply that managers,

trainers, and team members attend carefully to the process of designing and delivering training, that they consciously ask questions and strive for some common understanding on basic issues such as the meaning of teamwork for the organization and criteria for effective team performance.

The Adult Learner

Systems approaches to training are learner-centered and educators from varied perspectives have agreed on one thing: who the learners are affects the content, structure, sequence, methods, and media (Romiszowski, 1981) and influences the overall effectiveness of a training program (Tannenbaum & Yukl, 1992). Instructional designers, speaking from a behaviorist stance, asserted "How a learning system is designed will always depend on who the learner is" (Davis, et al., 1974, p. 185). Campbell (1988), an industrial/organizational (I/O) psychologist, included "accounting for individual differences" as a separate step in his formulation of training program design. Knox (1986), an adult educator, asserted that "effective teaching depends on being responsive to the learners in the program, not to adults in general" (p. 38). Nevertheless, he admitted that generalizations about adult learners help teachers/trainers gather the necessary information to make wise instructional choices.

There is no comprehensive theory of adult learning (Brookfield, 1986; Merriam, 1993; Tuijnman & van der Kamp, 1992), partly because of the diversity and complexity of adult life and learning and partly because of the multitude of theoretical perspectives (Feuer & Geber, 1989; Tuijnman & van der Kamp, 1992). For this reason, theorists have recommended a multifaceted, pluralistic approach (Merriam, 1993; van der Kamp, 1992),

one that, according to Jarvis, recognizes the "profound philosophical bases that are in practice" (Spear, 1986, p. 15) and that allows for constant questioning of assumptions rather than strict adherence to one ideological position and set of methodologies (Spear, 1986). Even with the diversity of perspectives and ambiguities, concepts about the adult learner, the learning environment, and the teaching/learning transaction have practical and immediate implications for workplace trainers.

While instructional designers, I/O psychologists, organization development specialists, and adult educators have all addressed the adult learner, the specific variables and the relative importance of variables have differed from discipline to discipline. According to all perspectives, a clear understanding of the learners helps the workplace trainer design learning opportunities for only the essential knowledge, skills and attitudes necessary for successful workplace performance, at the appropriate level of difficulty and complexity, using the most effective methods to ensure learning and transfer.

ISD models have highlighted the concept of "entry behaviors" (Davis, et al., 1974; Dick & Carey, 1985, Seels & Glasgow, 1990). Entry behaviors are generally regarded as prerequisite (Davis, et al., 1974; Dick & Carey, 1985), what the learner already knows or can do which will enable him/her to learn new tasks or skills. What the person knows and can do is increasingly framed in terms of the cognitive aspects of human learning. Gagné et al.'s Principles of Instructional Design, (1992) for example, focused on memory structure and organization–the learner as a human information processor.

In addition, instructional designers have been advised to understand the principles of "human physical, emotional, social and mental growth and development" as well as to have a knowledge of how "socioeconomic status, IQ, sex differences, cognitive styles, creativity, and motivation may affect learning" (Schiffman, 1986 p. 17). Although ISD texts (Dick & Carey, 1985; Seels & Glasgow, 1990) have listed many individual differences to be assessed through diagnostic pre–tests, observations, interviews, focus groups, critical incidents, and self–administered and supervisor–completed skill assessments (Latham, 1988; Rossett, 1987), they have provided little guidance in the implications of such characteristics for training design.

The I/O training literature, like ISD, addressed can do variables, but added another, will do (Wexley, 1984). Can do variables refer to those characteristics related to knowledge, skill, ability, and experience; will do to motivational or volitional aspects. Researchers in this tradition have proposed models describing both attitude and attribute factors influencing trainee effectiveness in a training program (Noe, 1986).

Among the aspects of motivation studied have been self–efficacy (Gist, Schworer & Rosen, 1989), motivation to learn (Noe & Schmitt, 1986; Mathieu, Tannenbaum & Salas, 1992), and specific motivational strategies such as participation, goal–setting and accountability, (Baldwin, Magjuka & Loher, 1991).

Adult educators have taken yet another approach to the issue of adult learners, focusing attention on topics such as participation—who participates in what type of learning activities for what reasons (Cross, 1981)—and adult development—how, when and what adults can and do learn (Cross, 1981). Participation research revealed that about half of

organized learning is related to work (Darkenwald & Merriam, 1982; Merriam & Caffarella, 1991), and that personal, situational (Cross, 1981; Knox, 1986), and institutional (Cross, 1981) factors may either facilitate or hinder participation depending on the nature of the specific factor and the way in which the individual perceives it (Knox, 1986). In the workplace, for example, organizational expectations and individual aspirations and expectations may affect the desire and willingness of employees to participate in work–related training. Organizational expectations affect who receives training, how much and what type of training received (Knox, 1986).

Adult development research has focused on cognitive processes including learning style, physical functioning, and the effects of the aging process (Cross, 1981; Knox, 1986: Merriam & Caffarella, 1991) as well as psychological development and socio–cultural experiences (Cross, 1981; Merriam & Caffarella, 1991).

Perhaps the most influential and foremost proponent of a uniquely adult approach to learning and education has been Malcolm Knowles. Knowles (1990) first appeared on the adult education scene in 1973 with the publication of The Adult Learner, A Neglected Species. Citing humanist and developmental psychologists, Knowles outlined a series of basic assumptions about adults as learners and guidelines for practice, emphasizing learner involvement in all phases of the learning experience. Knowles has provided primarily anecdotal and case study data about the effectiveness of the andragogical approach, with references to a limited number of studies addressing student preferences for andragogical methods and teachers' use of such methods.

Unfortunately, as is the case with other areas in the design and training of workplace training programs, few guidelines exist as to which characteristics or individual differences of the adult learner are most important to consider, and once assessed, what implications these characteristics have for designing effective training programs. Little empirical evidence, additionally, is available on the relationship between learner characteristics and training program design and effectiveness, especially in workplace settings (Baldwin & Ford, 1986; Tannenbaum & Yukl, 1992).

Perhaps the most significant implication of these rich, but often confusing and complex ways of looking at adults is the recognition that one size doesn't fit all. Accounting for individual differences, as advocated by Campbell (1988) means more than a skill and knowledge pre–test. Trainees bring a myriad of experiences, characteristics, attitudes, skills, knowledges and expectations to any training experience—attitudes and attributes that will affect the quality of the learning experience, whether they are considered or not.

Teams and Teamwork

Applying a systems perspective to the problem of enhancing team performance results in a number of key questions. What is a team? What variables influence team performance? What is effective team performance? What do team members need to know and be able to do, individually, and collectively? The literature on teams and teamwork provides insight into these questions.

Team: Definitions

Groups have been called the basic building blocks of organizations. But is any work group a team? According to Hare (1992) although all teams are groups, not all groups are teams. The distinctions between work group and team, however, are unclear, with terms often used interchangeably. The lack of a common operational definition creates obstacles for research and practice, as one doesn't know if researchers and practitioners are talking about the same entity. Defining what is meant by a team—within a particular organization—helps clarify the specific subsystems which will be part of the analysis and the focus of any training/learning intervention.

Early researchers in the group dynamics tradition focused on small groups in a multitude of settings, from family groups to therapy groups. As a result, definitions are general and broad. Cartwright and Zander (1968) defined a group as "a collection of individuals who have relations to one another that make them interdependent to some significant degree" (p. 46). Years later, Shaw (1981), defined a group as "two or more persons who are interacting with one another in such a manner that each person influences and is influenced by each other person." (p. 8).

The term group was used almost exclusively in the social psychology literature, as reflected in Psychological Abstracts, until 1971 when team was used in conjunction with teaching. Teams, referring to a specialized type of group, did not appear in the abstracts until 1988 (Hare, 1992). Researchers in other disciplines used the term team much earlier. Boguslaw and Porter (1962), working in a systems engineering perspective, focused on task-oriented, man-machine interactions:

> a relationship in which people generate and use work procedures to make possible their interactions with machines, machine procedures, and other people in the pursuit of system objectives (p. 387).

The team building literature provided yet another perspective, focusing on the emotional or psychological feelings and experience of the individual. Dyer (1987) defined teams as "collections of people who must rely on group collaboration if each member is to experience the optimum of success and goal achievement" (p. 4). Francis and Young, (1989) called a team an "emotional entity, " (p. 6)

> "an energetic group of people who are committed to achieving common objectives, who work well together and enjoy doing so, and who produce high quality results" (p. 8).

Recent definitions have incorporated the interaction and interdependence concepts of the early group dynamics literature, while stressing the importance of shared goals and accountability. Katzenbach and Smith (1993), authors of a popular press book, The Wisdom of Teams, called a team

> a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable (p. 45).

These authors, concerned with the design and development of high performing teams, included a team design characteristic—complementary skills—characteristics which may not be necessary in groups such as the family.

Finally, a recent academic definition reflected both industrial/ organizational and human factors perspectives:

> 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 (Salas, et al., 1992, p. 4).

The concern in this study was to distinguish a team from a work group, but also to state the concept in a nonacademic manner to engage survey respondents. Thus, for the purposes of this study, a team was defined as two or more people who commit to working together, interdependently, to achieve a common goal.

Models

Defining team is just a beginning. A model of team performance helps the workplace trainer who faces a "bewildering array of personal, group and organizational variables that may impact, directly or indirectly, on a group's outcomes" (Cummings, 1981, p. 250). Indeed, a criticism of the voluminous material on groups is the lack of a unifying framework (McGrath & Kravits, 1982); nevertheless, many models have been developed to serve as general, conceptual organizing devices.

Models appear to belong to one of two primary traditions, the humanist or task-oriented perspective (Gladstein, 1984). Those of the humanist school, typically presented in narrative format, describe the

quality of interaction and relationships between the team members. The lists of characteristics of the ideal, high performing work group provided by McGregor (1960) and Likert (1961) are key examples. In general, these descriptive models emphasized maintenance functions and norms such as equal participation, open communication, cohesiveness, and commitment.

A recent model in this tradition, based on a qualitative study of unusually effective teams, was validated against 32 management teams (Larson & LoFasto, 1991). The final model consisted of a narrative list of eight characteristics: a clear, elevating goal, result-driven structure, skilled competent members, unified commitment, collaborative climate, standards of excellence, external support and recognition, and principled leadership.

Task–oriented group models are usually presented graphically in an input–throughput–output, systems paradigm first presented by McGrath (1964). The major input categories in this "frame of reference for analysis of groups," (p. 69) were group composition, group structure, task and environment. Throughput consisted of group process and output included task performance, group development and effects on members. Patterns were an important part of McGrath's model. Group composition was defined as the pattern of characteristics members bring to groups; group structure as the pattern of positions and roles; and group process as the pattern of interactions among group members. This input–throughput–output model, with group process as the mediating variable between input and performance, has become the standard for task-oriented theorists (Hackman & Morris, 1975).

Representative task-oriented models are those of Hackman (1987), Gladstein (1984), and Tannenbaum et al. (1992). These task-oriented models all include varying levels of analysis, and they all emphasize team process. They differ on the specific concepts or variables included, the exact nature of the inter–relationships, and the emphasis given to the variables (Goodman et al., 1987).

Hackman's normative model of group effectiveness (1987), called a "major influence in shaping current thinking about work groups" (Goodman et al., 1987, p. 126), emphasized the interaction among variables and the importance of the organizational context in which the team operates (Salas et al., 1992). Gladstein's (1984) comprehensive model, tested on 100 sales teams, integrated concepts from McGrath, Hackman, and the humanist theorists. She identified input variables at both the group and organizational level, combined task–oriented and maintenance concepts as well as boundary spanning at the group process stage, and simplified group effectiveness to performance and satisfaction. She viewed the task as a moderator variable, hypothesizing that relationships between process and output varied with the nature of the task.

Another conceptual model, used as an organizing framework for an overview of team training (Salas, et al., 1992), and a literature review on team building (Tannenbaum et al., 1992), acknowledged the pervasive influence of organizational and situational characteristics on all aspects of the team and the complex web of inter–relationships among the many categories of variables. Versions of the model incorporated the concept of team development, the notion that teams change over time (Gersick, 1988;

Salas, et al., 1992). Developed by researchers interested in enhancing team effectiveness, it also highlighted potential process interventions.

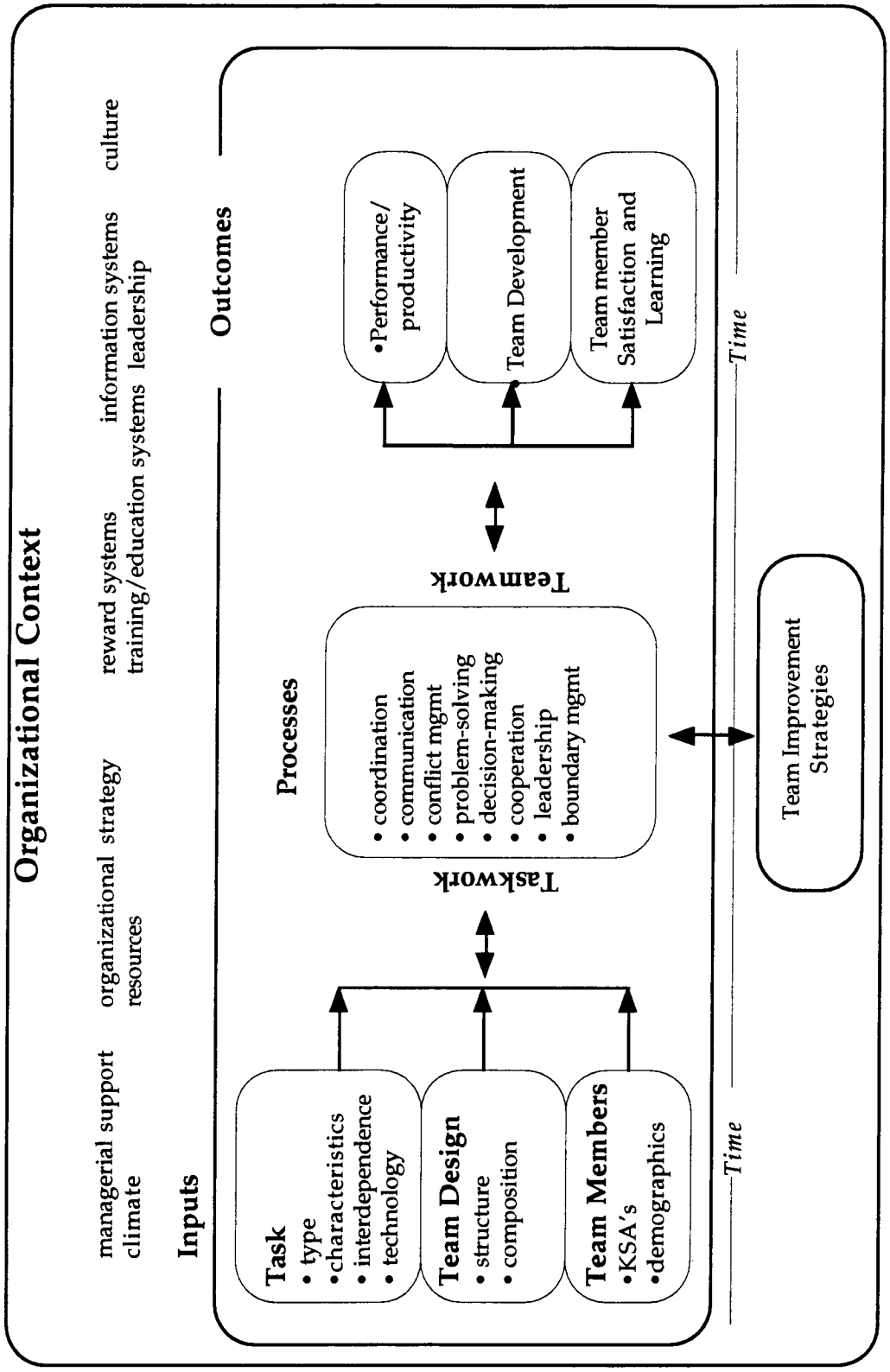
A hybrid, integrated conceptual framework, depicted in Figure 2.2, borrowing from all the above models, served as an organizing framework for this study. Since this study was about teamwork training, the concepts included in the model were those determined most relevant to a workplace trainer and supported by ISD models. Primary components of the model are described below.

Organizational Context

Teams do not exist within a vacuum; they work within a particular organizational context, often in conjunction with other teams. Organizational factors within this performance context can support or discourage team performance. Indeed, some researchers have asserted that teams cannot be expected to perform well nor can interventions be expected to impact team performance in inhospitable contexts (Bettenhouse, 1991; Goodman, et al., 1987).

Commonly cited organizational variables assumed to influence team effectiveness are managerial support and leadership (Campion, et al., 1993: Dyer, 1987; Gladstein, 1984, Goodman et al., 1987; Larson & Lofasto, 1989; Leimbach, 1992); reward systems (Gladstein, 1984; Goodman et al., 1987; Hackman, 1987; Lawler, 1986; Leimbach, 1992; Shea & Guzzo, 1987); training or educational systems (Campion, et al., 1993; Gladstein, 1984; Hackman, 1987; Poza & Markus, 1980); culture and climate (Cummings, 1981; Poza & Markus, 1980; Tannenbaum, et al., 1992), and resources (Shea & Guzzo, 1987). Other factors include information systems

Figure 2.2 Teamwork Training Model



(Hackman, 1987; Lawler, 1986; Leimbach, 1992), personnel/HR systems (Goodman et al., 1987; Leimbach, 1992), level of stress (Tannenbaum, et al., 1992), environmental uncertainty (Tannenbaum, et al., 1992), autonomy (Sundstrom et al., 1990), and inter–group relations (Brett & Rogness, 1986; Campion, et al., 1993).

Although recent team models have incorporated organizational variables, little systematic research has been done to identify the nature and scope of these factors or their impact on team performance and effectiveness (Goodman et al., 1987; Sundstrom et al., 1990). Researchers have focused on psycho–social variables and interaction processes, often ignoring organizational level variables (Bettenhouse, 1991; Goodman et al., 1987).

The sparse research that does exist tends to support the importance of contextual factors on work performance. Peters and O'Connor (1980) defined situational constraints as those "aspects of the immediate work situation...that interfere with the translation of abilities and motivation into effective participation" (p. 391) and identified eight specific factors that can hinder individual performance if unavailable, or of inadequate quantity or quality. Kolodny and Kiggundu (1980), working in a socio–technical frame, identified organizational factors unique to a specific work setting, including shift hours, schedules, rotations, transportation and living arrangements, machinery maintenance and supervisory policies, that influenced the performance of work teams.

Gladstein (1984) identified that actual sales performance of the 100 sales teams studied was directly affected by market growth and experience levels. This was not what group members perceived influenced

performance. Self–reported ratings of satisfaction and performance were positively correlated with open communication, supportiveness, active leadership, training and experience in the organization. Campion et al., (1993), on the other hand, found that context factors in his model, specifically training, managerial support, and communication and cooperation between groups, were related mostly to satisfaction and managerial judgments, but not to objective productivity data.

Finally, a recent survey by Wilson Learning Corporation (Leimbach, 1993) of 4500 team members from more than 50 organizations identified two categories of barriers to team effectiveness: organizational and individual. The most commonly cited organizational barriers were rewards and compensation, personnel and HRD systems, information systems and organizational alignment. Over 80% of respondents, for example, stated that reward systems focused on the individual, providing little incentive for teamwork. Similarly, 80–90% of the respondents said that team issues were not considered in the performance appraisal system.

Although individual factors are a key part of team effectiveness, theorists such as Goodman et al. (1987) have suggested that organizational variables may constrain the human factors by creating a "ceiling effect" (p. 135).

Team Inputs

The task, team design and team members are the primary inputs to the team, inputs which interact to accomplish the team's goals.

Team task.

Task analysis is a key component of the systems training model. Researchers agree that the team's task is an important variable influencing both team interaction and process outcomes (Hackman, 1990: Hackman & Morris, 1975; McGrath, 1984; Steiner, 1972). In group research, tasks are typically categorized on the basis of broad task types as well as more defined task characteristics. Both aspects of tasks have been shown to have either a direct or moderating effect on teamwork or output (Hackman & Morris, 1975; Steiner, 1972).

Taxonomies of task types are based on qualitative differences among tasks. Steiner (1972), for example, divided tasks into nine categories based primarily on the nature of interactions among group members as well as qualities of the output. Herold (1978) differentiated tasks on the basis of technical and interpersonal demands. McGrath (1984) integrated many earlier models into a complex typology of four major task types (generate, execute, negotiate and choose) arranged according to two primary dimensions: cooperation or conflict, and conceptual or behavioral.

These broad categories of task types may differ along other dimensions which can influence interaction. Two important dimensions are task complexity, the demand or information processing load imposed and task difficulty, the level of effort required for successful performance. Complexity is perhaps the most significant task–related variable (Naylor & Briggs, 1965). Both complexity and difficulty affect coordination demands (Shaw, 1981; Shiflett, 1972) and the communication structure (Shiflett, 1972). Basically, the higher the difficulty and complexity, the more essential is it for members to communicate, coordinate and cooperate. Other task

dimensions which have been shown to have significant relationships to team effectiveness are task variety and task significance (Campion, et al., 1993).

Interdependence.

When designing teamwork training programs, how the tasks performed by individual workers are integrated to accomplish the overall team task must be considered. Task interdependence, the degree to which team members must rely on one another to accomplish work, is a primary determinant of interaction and performance. The interdependence of team members may be influenced by the complexity and difficulty of the task, by the task organization, or by the work flow, the way tasks and sub tasks are sequenced, arranged and assigned. The nature of the interdependence required to accomplish the task has been shown to affect the level of cooperation (Kabanoff & O'Brien, 1975), the nature of interpersonal interactions (Gersick, 1988), the task strategies (Hackman, Brousseau & Weiss, 1976; Kabanoff & O'Brien 1979), intragroup conflict (Saavedra, Earley, & VanDyne, 1993) and output (Shiflett, 1972).

Technology.

Another factor, closely allied with the team's task with the potential to affect task coordination and team process, is technology, the system of equipment, materials, physical environment, and programs and policies, (Goodman et al., 1987). Technology may, in fact, directly affect the design of the task, the work flow, the structure of the team, the skills required, and the nature of the team's interaction (Goodman et al., 1987; Sundstrom. et al., 1990).

Classic studies in British and U.S. coal mines highlighted the importance of technology (Goodman et al., 1987; Trist & Bamforth, 1951). Changes in equipment led to changes in tasks, coordination and specialization. Ostroff & Ford (1989) acknowledged the importance of considering technology in the analysis phase of training design, cautioning that technology may differ at the organizational, unit and individual level.

Team design.

Team members must be organized in some manner to accomplish their task. Factors relating to organization are often clustered under team structure, the "relatively stable arrangements among people, especially in terms of division of work and methods of coordination and control" (Gladstein, 1984, p. 501). Among the many structural factors hypothesized to affect interaction and thus team performance are team size (Campion et al, 1993; Cummings, 1981; Gist, Locke & Taylor, 1987; Gladstein, 1984; Jewell & Reitz, 1981; Meister, 1976); roles and responsibilities (Gladstein, 1984; Jewell & Reitz, 1981; Larson & Lofasto, 1989; McGrath, 1964); team norms (Cummings, 1981; Gladstein, 1984; Hackman, 1987; Jewell & Reitz, 1981); leadership, including distribution of power and authority (Gist et al., 1987; Gladstein, 1984; Jewell & Reitz, 1981; Larson & LoFasto, 1989; McGrath, 1964; Tannenbaum et al., 1992); and cohesiveness, including commitment to one another and to the task (Cummings, 1981; Goodman, et al., 1987; Jewell & Reitz, 1981; Tannenbaum et al., 1992; Larson & Lofasto, 1989). Additional structural concepts include boundary control and management (Cummings, 1981; Gladstein, 1984) communication patterns (Jewell & Reitz, 1981; McGrath, 1964; Meister, 1976); goal clarity (Gladstein, 1984; Larson & LoFasto, 1989); team resources (Larson & LoFasto, 1989;

Tannenbaum et al., 1992); team climate (Larson & LoFasto, 1989; Tannenbaum et al., 1992); team potency (Campion et al., 1993; Shea & Guzzo, 1987), and flexibility in terms of job assignments (Campion et al., 1993).

Although it is important to consider team members as individuals, it is also essential to consider team composition or what happens when a particular group of individuals are gathered together into a team (Hackman & Morris, 1975; McGrath, 1964; Morgan & Lassiter, 1992; Shaw, 1981). Team composition can influence both process and output. Being on a team with others creates a context which may remind individuals of their unique status (i.e. ethnic minority or female) and thus may reinforce certain behavior patterns consistent with that perceived status (Levine & Moreland, 1990).

In order to determine the potential influence of team composition, McGrath (1964), recommended considering not only the level of the individual characteristics, but also the collective pattern of characteristics, represented by the homogeneity or heterogeneity of the group or the extent to which members differ from each other on certain characteristics (Jewell & Reitz, 1981; Shaw, 1981), as well as the group's compatibility, the extent to which the diverse characteristics fit together (Morgan & Lassiter,1992). Heterogeneity is assumed to positively affect team performance when tasks are complex and diverse, requiring a wide range of competencies (Gladstein, 1984; Goodman et al., 1987; Hackman 1987). Heterogeneity can lead, however, to intragroup conflict, thus more homogenous groups are advised when the primary issues of concern are team members' satisfaction, conflict or communication (Pearce & Ravlin, 1987).

While a great number of team composition factors have been identified, much of the research is considered atheoretical (Levine & Moreland, 1990). Furthermore, it is asserted that the importance of team composition to team functioning and performance hasn't been widely investigated (Campion, et al, 1993), and that existing evidence has been complex and unclear (Morgan & Lassiter, 1992). Much of the ambiguity seems to stem from the highly interdependent nature of group processes, specifically the interaction of factors such as the organizational or performance context, the nature of the group and the task.

Team members.

Ultimately, a team is comprised of individuals. Many different individual characteristics, including knowledge, skill, attitudes, and demographic characteristics, have been hypothesized to affect group processes. Among these individual characteristics are sex (Cohen & Zhou, 1991; Wood, 1987), ability and motivation (Tziner, 1988; Tziner & Eden, 1985; Hackman & Morris, 1975), individual preference for group work (Campion et al, 1993), personality (Driskell, Hogan, & Salas, 1988) and ethnic diversity (Kirchmeyer, 1993; Shaw, 1981), characteristics which may become more important with the changing nature of the work force. A new construct, mental models (Cannon–Bowers, Salas, & Converse, 1990) offered insight into the differing cognitive representations individuals may have about the nature of teamwork and their task and the impact of these models on coordinated performance.

Team Processes

Team processes are typically the focus of team building and team training programs, based on the belief that "something important happens in group interaction which can affect performance outcomes" (Hackman & Morris, 1975, p. 49). This "something" could potentially lead to either process losses or process gains (Steiner, 1972). There is, however, confusion over exactly what this important something is and what knowledge, skills, and abilities lead to effective team processes.

Team interaction is described in terms of interpersonal and task behaviors. Extensive lists of such behaviors have been proposed as critical to team process. Researchers and theorists, however, typically consider only a limited number of potential process behaviors, often focusing on either task–related or maintenance behaviors based on early discussions of varying roles in groups (Benne & Sheats, 1948). Task–related behaviors focus primarily on performance strategies (Hackman & Morris, 1975), efforts to coordinate work to accomplish the team's task. Maintenance behaviors address the nature of the relationships among team members (Likert, 1961; Dyer, 1987). Complicating this dichotomy is the fact some behaviors can be critical on both task and maintenance dimensions and a single behavior may have multiple effects.

Attempts have been made to summarize the key process behaviors. Hackman and Morris (1975) presented three summary variables: member effort, performance strategies, and the application of member knowledge, skills, and abilities. Jewell and Reitz (1981) described five major categories of behaviors: communications, decision making, influence, cooperation and competition. Gist, et al., (1987) identified three major process

variables—influence, development and decision making—each with subsets of processes. Decision making, for example, incorporated participating, generating alternative information, evaluating alternatives, and building consensus. Gladstein (1984) measured both maintenance behaviors (open communication of ideas and feelings, supportiveness and low interpersonal conflict) and task behaviors (weighting individual inputs, discussing performance strategies, and managing the team's boundaries). Based on a critical incident technique, Navy researchers (Oser et al., 1989) identified 68 critical behaviors, which were then clustered into seven major categories: communication, cooperation, team spirit and morale, giving suggestions or criticism, acceptance of suggestions or criticism, coordination, and adaptability.

Trainers are interested in what people do in a team and in the requisite knowledges, skills, and abilities. Participants in a workshop, representing primarily the military and nuclear power industries, identified two basic types of team skills: generic and operational. Generic team skills (effective communication, feedback, effective influence, conflict resolution and leadership) were assumed necessary for any type of team. Operational team skills (information exchange, information evaluation, task assignment, performance direction, performance feedback, coordination, strategy development and problem solving and decision making), however, were defined as task and situation specific (Davis, Gaddy, Turney, & Koontz, 1986).

A recent review of the literature from socio-technical systems theory, organizational behavior, social pschology and industrial engineering resulted in the delineation of fourteen specific knowledge,

skill and ability requirements for teamwork. Major categories of interpersonal and self-managment KSA's were defined as conflict resolution, collaborative problem-solving, communication, goal setting and performance management, and planning and task coordination (Stevens & Campion, 1994).

Educators defined teamwork as one of the essential workplace basics. Further confirmation of the diversity of interpersonal and teamwork skills was provided by Baker and O'Neill (1992) who reviewed the categories from five major studies of work force skills; the SCANS report, ASTD's Workplace Basics, the Michigan Employability Skills Employer Survey, the Basic and Expanded Basic Skills survey conducted by the New York State Education Department and the National Academy of Science's High Schools and the Changing Workplace: The Employers' View. Although all studies included the category of teamwork skills, "this category exhibited the greatest diversity in terms of the specific sub skills which constitute it" (p. 17).

There is no clear consensus as to exactly what behaviors lead to effective team process. It is not known if it is necessary to define the critical behaviors unique to each team, based on the interaction of task, technology, work flow, individual member skills and expertise, team structure, and desired outcomes or if there are generic team behaviors, applicable to a wide variety of tasks in a wide variety of contexts. The linkage between behaviors and underlying knowledge, skills and attitudes is also unclear.

The evidence on the impact of process behaviors on team performance is mixed. Gladstein (1984) found that team members had

implicit theories of group effectiveness which matched traditional humanist theories, namely, an emphasis on interpersonal process variables such as open communication, supportiveness, leadership, training and increased organizational tenure. While these variables were related to self-reported ratings of satisfaction, they were not related to actual sales performance which was related to factors outside the control of the teams, namely, market growth and organizational tenure. Campion et al., (1993) found that process characteristics were related both to productivity and to managerial judgments.

Evidence also exists that effective and ineffective teams can be distinguished on the basis of specific observable behaviors. In several field studies of operational teams in a Navy training environment, good teams exhibited more effective behaviors and a wider range of behaviors than less effective teams. In addition, teams displayed changes in behaviors over the duration of training, supporting the concept of team learning and development (McCallum et al., 1989; Morgan, et al., 1986; Oser, McCallum, & Morgan, 1989).

Team Outcomes: Effectiveness

"There is no commonly accepted meaning of work-group effectiveness" (Goodman et al., 1987, p. 136). Numerous criteria have been used as indicators of group effectiveness, both in theoretical models of work groups and in the design and implementation of team interventions.

Models of work groups include relatively global, multidimensional indicators of effectiveness. In 1964, McGrath stated that group process resulted in three different kinds of effects: task performance, group development and effects on members. This three dimensional view has

been further refined by Hackman (1987) and seems to be accepted by organizations (Lemibach, 1992). In Hackman's model, team effectiveness can be measured at three levels of analysis: organizational, team and individual.

At the organizational level, the primary issue is whether the task output, the product or service delivered by the team, is acceptable to those who receive or review it. Typical criteria include the quantity and quality of the output, time, errors, cost and productivity (Leimbach, 1992; Tannenbaum, et al., 1992). According to one survey (Leimbach, 1992), task performance was the primary criterion, used by 84% of responding organizations, to judge if a team was effective.

At the team level, the primary issue is if the team has developed the systems, processes, and relationships to continue to collaborate effectively. Changes in team cohesiveness, norms, roles, problem-solving and decision-making techniques are frequently considered (Leimbach, 1992; Sundstrom, et al., 1990; Tannenbaum, et al., 1992). Fifty-three percent of survey respondents considered team process variables (Leimbach, 1992)

And at an individual level, the concern is the degree to which individual members needs are more satisfied than frustrated by the team experience. In addition, changes in team member skills and attitudes might be assessed (Leimbach, 1992; Tannenbaum, et al., 1992). In the workplace, 41% of survey respondents used team member satisfaction as an effectiveness measure (Leimbach, 1992).

Improving Team Effectiveness

Concepts about learning, the adult learner, and teams merge in the design of interventions to improve team effectiveness. According to researchers, two distinct approaches exist: team building and team training (Tannenbaum, et al., 1992). Both approaches have as a central purpose the improvement of team performance. While both team building and team training may result in similar outcomes, their theoretical underpinnings and the processes used to achieve outcomes differ (Tannenbaum et al., 1992). The differences in underlying assumptions and beliefs about learning and the adult learner and resulting methodologies is another example of the tension between hard and soft approaches in the workplace training arena.

Team Building

Team building is defined very broadly as "interventions designed to improve the effectiveness of a work group" (Tannenbaum, et al., 1992, p. 119) or more specifically as a

> long–term data–based intervention in which intact work groups experientially learn, by examining their structures, purposes, norms, values, and interpersonal dynamics, to increase their skills for effective teamwork (Liebowitz & deMeuse, 1982, p 2)

Team building, in its classical form, traces its historical roots to the early 1930's and the human relations movement, the study of group dynamics, and humanist assumptions (Dyer, 1987; French & Bell, 1984; Liebowitz & DeMeuse, 1982). As a technology, it had its genesis in a series of workshops first held in 1946 at Bethel, Maine, where participants

learned about themselves, others, and group processes (French & Bell, 1984; Rothwell & Sredl, 1992).

The initial form of intervention, T–groups (training groups), were subsequently modified as practitioners attempted to apply the methodologies to groups within the workplace. Exploratory, unstructured, groups of strangers focused on increasing individual self–awareness were replaced by intact work groups addressing work–related problems (Dyer, 1987; Liebowitz & DeMeuse, 1982; Weisbord, 1987) in order to change norms about performance strategies (Hackman & Morris, 1975). Team building efforts were designed to create an effective team, one that exhibited the characteristics defined in the early 60's by Likert (1961) and McGregor (1960).

Team building has been the most frequently used organization development (OD) strategy (Beer, 1976; Porras & Berg, 1978), and it has been predicted to be among the most important OD activities in the 90's (Fagenson & Burke, 1990). This is based on the concept, proposed by Likert (1961), that groups and teams are the basic building blocks of organizations (French & Bell, 1984). In 1994, team building was provided by 69% of organizations responding to an annual survey of industry practices ("Industry Report", 1994); up from 61% in 1991 (Lee, 1991).

The traditional approach to team building is an action research model consisting of data collection, feedback, and action planning (Beckhard, 1969; Dyer, 1987; Woodman & Sherwood, 1980). These three primary steps are often expanded to include additional activities such as scouting, entry, diagnosis, implementation and evaluation, and may be implemented with the help of an outside consultant who serves as

facilitator, data gatherer, process consultant, change agent, resource person, and trainer (Liebowitz & DeMeuse, 1982).

Team building is not a well–defined concept, since the process and programs are usually situation and problem specific (Buller & Bell, 1986). Most interventions, however, include a planned agenda of techniques, exercises, and follow up based upon the data collected (Liebowitz & deMeuse, 1982). By 1976, according to Beer, four basic team building models had evolved: goal setting, interpersonal relations, role clarification and the managerial grid. In recent literature reviews, a problem–solving approach has replaced the managerial grid model. The problem-solving model places more emphasis on the task, but may also incorporate aspects of other approaches (Tannenbaum et al., 1992), in recognition that one model may not be sufficient to address the complex, interdependent factors impacting a team (Liebowitz & deMeuse, 1982).

A number of necessary conditions for effective team building have been identified. These include management and leader support for the team building effort (Beckhard, 1969; Dyer, 1987; Galagan, 1986; Liebowitz & DeMeuse, 1982; Weisbord, 1987); a systems point of view (Hackman & Morris, 1975; Huszczo, 1990; Liebowitz & deMeuse, 1982); work that requires interdependence (Dyer, 1987; Liebowitz & DeMeuse, 1982; Weisbord, 1987); voluntary involvement of team members (Francis & Young, 1979; Weisbord, 1987); authentic participation or commitment by team members (Galagan, 1986; Weisbord, 1987); adequate time (Dyer, 1987; Francis & Young, 1979; Liebowitz & deMeuse, 1982); appropriate sequence of activities (Francis & Young, 1979); careful preparation or diagnosis (Dyer, 1987; Francis & Young, 1979; Hackman & Morris, 1975); a non threatening

environment (Francis & Young, 1979); a long–term commitment (Liebowitz & deMeuse, 1982); realistic expectations (Liebowitz & deMeuse, 1982); and follow–up (Dyer, 1987; Huszczo, 1990).

Although team building has generated reams of journal articles, books, and packaged programs, the research results on its efficacy in enhancing team productivity is mixed (Gist, et al., 1987; Sundstrom et al., 1990; Tannenbaum et al., 1992; Woodman & Sherwood, 1980). While it is generally agreed that team building efforts can lead to positive changes in attitudes and perceptions, the effect on actual team performance is less clear (Tannenbaum et al., 1992; Woodman & Sherwood, 1980). Some have asserted that the weakest research has achieved the most positive results (Eden, 1985; Woodman & Sherwood, 1980).

In a 1980 literature review, Woodman and Sherwood identified a number of limitations to team building research. In addition to weak research designs, most team building efforts were directed toward intact white collar teams, rather than start–up or blue–collar teams and most provided only a vague description of the intervention. For example, although diagnosis is a key part of team building models, few research studies described this step or indicated how the diagnosis shaped the nature of the intervention. In addition, although models of group effectiveness include multidimensional measures of effectiveness, two-thirds of the studies relied on affective measures rather than objective performance data. Only one-third used objective performance measures such as effects on absenteeism, turnover, costs or productivity. Because of these limitations, Woodman and Sherwood stated that fundamental

questions about the applicability and appropriateness of team building in general, as well as specific approaches were unanswered.

Researchers in the 80's took heed of Woodman and Sherwood's criticisms and increased the rigor of their designs. Unfortunately, this did not clear up the picture. In one well–designed study with three levels of measurement (reaction, learning and behavior), for example, the only significant finding was that team members reported high levels of satisfaction with the team development workshop. No significant results were noted on either a pre, post–test team survey or on subordinate ratings, leading Eden (1985) to state, "the safest conclusion is that the intervention had no impact" (p. 98). Like Gladstein (1984), Eden speculated on the influence of implicit theories of group process, wondering if trainers and consultants imparted expectations which influenced perception even though no real behavioral change occurred.

Tannenbaum et al.'s 1992 literature review of team building studies reported progress in research designs, although clear linkages between team building efforts and increased team performance and organizational productivity were still lacking. Again, 80% of the studies measured individual or team changes and only 40% assessed team performance. Nevertheless, the authors made several tentative research-based recommendations to enhance the effectiveness of team building efforts: targeted diagnosis for determining an appropriate approach to team building; realistic expectations about the effects of team building; and post–intervention or follow up strategies to alleviate regression (Tannenbaum et al. (1992).

Other limitations to team building have been noted, based on observation and experience. Liebowitz and deMeuse (1982) pointed out the traditional action research model is both time-consuming and expensive. Huszczo (1990) listed ten common pitfalls: confusing team building with team work; viewing teams as closed systems; failing to systematically plan an intervention; using a canned approach rather than assessing team needs; training individuals rather than teams; treating team building as a Japanese management technique or a program; assuming all teams are alike; relying on training alone without considering organizational systems; and failing to hold a team accountable for performance.

Sundstrom et al. (1990) suggested that inconclusive research results may be due to the focus of most team building interventions on internal group processes, ignoring external relations and the fact that teams exist within an organizational context. Hare (1992) criticized some of the activities commonly used in team building as unrepresentative of the types of problems typically found on the job. Specifically, activities frequently call for relatively low levels of creativity in ranking fixed lists of items or following prescribed rules to achieve a "correct" solution. Many work-related problems have no correct solution, but depend upon high levels of creativity and consensus building of a "preferred" solution given incomplete and ambiguous data and procedures. In addition, Hare hypothesized that many team building consultants follow a therapy–based model, emphasizing group dynamics and ignoring task functions of the group. This is similar to Goodman et al.'s (1987) assertion that the social psychological variables prevalent in many models of group performance

may actually have limited impact on group performance, being constrained by non human, organizational and technological variables.

Team Training

The other major approach to enhancing team effectiveness is team training, defined generally as "any experience in which a team engages which results in a change of team function, team organization, or team performance" (Boguslaw & Porter, 1962. p. 391). While this definition does not seem to distinguish team training from team building, a more recent definition provides more clarity:

> a systematic effort to facilitate the development of job–related knowledge, skills, and attitudes (KSA's). The specific knowledge skills and attitudes are determined and learning objectives are established prior to the start of the training (Tannenbaum et al., 1992, p. 126).

Team training emphasizes team performance and the specific behaviors and knowledge, skills and attitudes necessary to achieve effective performance (Gagné, 1962; Swezey & Salas, 1992).

Team training differs from team building in its historical roots, philosophical underpinnings, and methodologies. Team training, like ISD, appears to have its historical roots in systems thinking and military efforts to enhance the functioning of units or crews, many of which accomplished their team task with complex technological systems. Like ISD, early team training research seems to be behaviorist in nature, while more recent studies have incorporated cognitive learning concepts (Cannon–Bowers, et al., 1990). Unlike the generic descriptive lists of characteristics of effective teams proposed by Likert (1961) and McGregor (1960), which have served as

the criteria for team building, team training researchers have attempted to identify empirically the specific constructs of teamwork, the specific behaviors linked to effective team performance, the requisite knowledge, skills, and attitudes, and appropriate intervention strategies to enhance these behaviors.

Early team training research efforts were often funded by the military, took place in both laboratories and in the field and looked at specific task and team behaviors, often during man–machine interactions. During the 60's and 70's, for example, team training researchers studied communication content and patterns (Johnston, 1966); task complexity, task organization (Naylor & Briggs, 1965), task difficulty (Shiflett; 1972); stimulus and response fidelity (Briggs & Naylor, 1966); and team versus individual training (Johnston, 1966).

A literature review of 25 years of research on military teams and small group research (Dyer, 1984) resulted in eight recommendations for team training. The recommendations included providing performance feedback, training individual skills before team skills, sequencing team training in terms of complexity and increasing teamwork needs, training the entire team, conducting periodic follow–up training, simulating the performance environment, clarifying team goals and interdependencies, and helping individuals to analyze their own behavior and to help others when overloaded. Nevertheless, Dyer concluded that the area of team training lacked an adequate theory base and proposed a series of questions and methodological issues as a base for further research.

Organizations in high-risk environments have heeded Dyer's recommendations. One approach to team skills training was initiated by

the nuclear power industry motivated by nuclear accidents (Gaddy & Wachtel, 1992). A group of experts from the military and the nuclear industry met in a workshop format to view, critique, and modify a preliminary model of team skills training. The resulting systems training approach consisted of five major steps: team skills objectives development, basic team skills training, team task training, team skills evaluation and team training program evaluation. Workshop participants recommended that training begin at a basic level, providing a general introduction to generic team skills and practice in operational team skills, followed by task–specific training. It was recommended that such training integrate both task and team (maintenance) skills, utilize complex, realistic scenarios incorporating critical tasks, contextual distracters and barriers, and emergent or unpredictable tasks. In keeping with an ISD focus, the workshop participants recommended instructor guides to ensure consistency and structure. Finally, workshop participants recommended two levels of evaluation: team skills evaluation and program evaluation, including relatively open-ended debriefings, peer critiques, and more structured pre–, post– tests or supervisor ratings (Davis, et al., 1986).

Research, funded by the Nuclear Regulatory Commission, has continued, using this model to " (a) develop reliable, valid measures of team skills, and (b) to explore the relationships between team skills and overall safe crew performance" (Gaddy & Wachtel, 1992, p. 392).

Since the mid–80's, an integrated and comprehensive team training research effort has been carried out by the Naval Training Systems Center in Orlando, Florida. The approach has been to balance science and practice by using both field and laboratory experiments with air crews and tactical

decision–making teams. Research designs have been longitudinal and have used observations and critical incidents, as well as controlled laboratory experiments. Among the questions and technologies addressed include a definition of teamwork (Oser, et al., 1989), evolution of teams (Glickman, Zimmer, Montero, Guerette, Campbell, Morgan, & Salas, 1987), job and task analysis for teams (Hogan, Broach, & Salas, 1987), measurement of team performance (Morgan, Glickman, Woodard, Blaiwes, & Salas, 1986), training needs (Hogan, Peterson, Salas, Reynolds, & Willis, 1991), training design (Cannon–Bowers, et al., 1991; Swezey & Salas, 1992; Swezey, Llaneras, & Salas, 1992), and training delivery (Guerette, Miller, Glickman, Morgan, & Salas, 1987; Morgan, Salas, & Glickman, 1987; Smith & Salas, 1991).

Results of the research were compiled in Teams, Their Training and Performance, (Swezey & Salas, 1992), termed "the first of its kind" (p. xv). The authors emphasized its performance orientation and stated that the contents do not deal with team building or human resource aspects of teamwork. One hundred forty–six guidelines for the development of team training were included. The guidelines addressed major topics such as team mission and goals; environment and operating situation; organization size and interaction; motivation, attitudes and cohesion; leadership; communication; adaptability; knowledge and skill development; coordination and cooperation; team training situation; team evaluation; and training program assessment.

Prescriptions from a traditional ISD model for designing instruction for teams have also been proposed by Armstrong and Reigeluth (1991). The Team Instructional Prescriptions (TIP) Theory was based on Reigeluth and

Merrill's (1979) conditions–methods–outcomes framework. The TIP theory classified two sets of outcomes, effective and efficient team work and effective and efficient team task performance and three different team conditions, based on the development stage of the team, task process issues and task relationship issues. Specific instructional methods were then prescribed for each one of 36 unique instructional conditions.

Team Building and Team Training: A Brief Comparison

A summary of team building and team training is provided in Table 2.4. Team building and team training differ along a number of dimensions, although the desired outcome is the same. The most significant difference lies in basic assumptions about the nature of teamwork. Team building researchers appear to accept the definitions and characteristics of effective teams, including the stages of team development promulgated in the 60's and 70's. Team training researchers do not make these same assumptions, returning to basic questions to define operationally exactly what teamwork is in different situations, what variables affect teamwork, how specific teamwork behaviors relate to overall team performance, and how teamwork and team performance can be observed and assessed. Existing team training programs and interventions are also being studied to determine what happens during training and what effect team training has on subsequent job performance.

Table 2.4 Team Building and Team Training: A Comparison

Concept	Team Building	Team Training
Theory Base	• humanist psychology • social psychology • group dynamics • organization development • I/O psychology	• systems engineering • behavioral psychology • cognitive psychology • performance technology • I/O psychology
Major Researchers	• organization development specialists • social psychologists •industrial/ organizational psychologists	• human factors specialists • industrial/ organizational psychologists
Primary Applications	• white-collar employees	• units and crews in high tech, high risk environments esp. military, airlines, nuclear power
Research Focus	• laboratory and field studies • one–shot case studies • test specific techniques such as role clarification or problem solving	• laboratory and field studies • define constructs • define characteristics and functions of teams and teamwork • identify requisite KSA's • test specific training delivery methods
Intervention Process	• action research model	• ISD-oriented
Primary Intervention Focus	• interpersonal dynamics of team members	• task performance of team
Primary Dissemination	• academic journals, conferences • practioner journals, associations, workshops • hundreds of books, manuals, training activities	• technical reports • academic conferences • Teams, Their Training and Performance, 1992
Desired Outcome	• effective team performance	• effective team performance

Teamwork Training in the Workplace

Although researchers and academics distinguish between team building and team training, work place practitioners appear to integrate concepts and techniques from both approaches. In fact, many authors use the terms team building and team training interchangeably. This integration may be the result of factors described previously: the eclectic, pragmatic blend of various perspectives on learning and training; the increased use of teams within organizations; the expansion of teams from primarily white collar workers to workers at all levels and across all functions; and a greater use of systems approaches to training. Other contributing factors may be increased accountability for both teams and training, a general blurring of the distinctions between training, education, and development, and limitations of both team building and team training approaches. Still another factor may be the recognition, as stated over 20 years ago by Hackman and Morris (1975), that no single intervention package can meet the needs of every group. Likewise, no single perspective on such a complex problem as enhancing team effectiveness may be adequate.

Examples of an integrated approach have a relatively long history. In 1977, Woodcock presented a manual of team development activities based on his years of experience. While Woodcock is generally considered to be a team building expert, many of his recommendations have a distinct "training" quality to them. He included guidelines for defining training events and provided examples of specific training designs. Woodcock encouraged facilitators to always define objectives, to select activities and

lectures to help achieve the objectives, to plan time and sequence of activities, to try out activities before implementation, and to involve participants as much as possible in defining the problem (pp. 36-37).

More recently, Orsbrun et al. (1990) recommended training agendas for members at all levels of the organization in the move to self-directed teams. For example, team members are to be trained in "work–team awareness, technical skills, interpersonal skills, problem-solving, and administrative procedures " (p. 271). While it is acknowledged that training content and format "should be tailored to those receiving the training", it is also recommended that the "same participant materials, visual aids, and session format...will ensure that a consistent message is delivered to everyone" (p. 260).

Parker (1990) challenged training professionals to offer an introductory workshop and a series of modules addressing specific team-player skills. Wellins, et al (1991) identified the need for three types of training for self-directed teams: job skills, team/interactive skills and quality/action skills. Harshman and Phillips (1994) recommended training modules covering interpersonal and team dynamics, productivity improvement, and basics of business operation as part of an overall team development strategy for an organization.

These practitioners did not distinguish between team building and team training. They recognized the need for both training and development of task and maintenance skills within the context of a specific organization. They cautioned against canned or cookbook approaches and emphasized careful diagnosis of the organizational context prior to any training effort.

Whether a trainer chooses to use a team building, team training or integrated approach probably depends upon a number of factors, including his or her experience, training, skills, philosophical orientation, the time and resources available for designing and implementing any intervention, as well as the organizational context in which he or she works.

Following a systems approach to training, a trainer or facilitator would be aware of the concept of equifinality: that a team may develop its skills and performance from various initial conditions and by a variety of means (Katz & Kahn, 1978). Nevertheless, a trainer would begin any training process with a model about the design process in general, the content of the training program, and the persons who would be trained. Table 2.5 uses the ADDIE model as a general framework to present and organize some basic questions about the training and performance situation for teams, considering the organizational, team, task and individual variables that might impact the analysis, design, development, implementation and evaluation of any teamwork training process in the workplace.

Team System	Analyze	Design/Develop	Implement	Evaluate
Organization	•What contextual characteristics affect the team/training? •What is the level and nature of mgmt support? •What org'l systems may affect teamwork and training? •With what other groups must the team interact? •What alternatives to training exist? • Is training the best alternative? •Who will be involved in the analysis process?	•How do training goals/objectives link with organizational objectives? •What resources are available for design/development? •What design/ development processes are congruent with org'l cluture? •Who will be involved in the design and development process? What will their roles be?	•What resources are available for training? •What barriers may hinder training? •What are expectations for learning/training systems? •Where should training take place: on-the-job. classroom, offsite, etc? •Who should conduct or facilitate training? •How much time is available for training? • What type of follow-up is desirable/feasible?	•Who will evaluate the training? •What performance standards must the training meet? • What is the level of support for training evaluation? •What types of data will be collected, in what manner, when, by whom?
Team	•How is the team structured? •What is its size? •What is the team's composition? •What team roles and norms exist? •What is the current team climate and culture?	•What are the team's goals? •How do the team's mission/goals/objectives link to organizational objectives? •How committed is the team to its goal, to the training?	•How will the nature of the team influence training delivery? •Will team members be trained individually or as a team? •Will training be voluntary or mandatory? •How do team members learn best?	•Who will evaluate the team's performance? •What performance standards must the team meet? •How will the team evaluate its own performance? Against what standards?
Task	•What is the task/goal of the team? • How might the task type affect teamwork?	•What performance objectives will be established? •What type of activities will be used?	•To what extent will training activities replicate actual team tasks?	•How will task accomplishment be assessed? •What type of try-out, if any, will be used?

Table 2.5 (Continued)

Team System	Analyze	Design/Develop	Implement	Evaluate
Task (cont.)	•How might task characteristics affect training? •What technology does the team use to complete its work? •What is the task work flow and inter-dependence? •What performance strategies are required to perform the task? •What KSA's are required to complete the team task?	•What training principles will be used? •What type of practice will be provided? •What type of feedback will trainees receive? •How will training be organized, sequenced, paced? •What follow-up will be provided?	•What behaviors must facilitors or instructors model during training activities?	
Individual	•Who will be trained? •What specific generic and operational KSA's do individual team members currently possesses? •What KSA's do they need to perform successfully as a team member? •What individual differences must be taken into account? •How involved will ind. be in entire process?	•How will individual objectives be considered? •What individual differences will be accommodated? •What instructional techniques will be used to accommodate individual differences?	•What expectations do individuals have for training or learning experiences? •What will be the role of the individual team members in training?	•How will individual performance be assessed? •How will reactions to training be assessed? •How will individual input be used to modify training programs?

CHAPTER III
METHODS AND PROCEDURES

The purpose of this study was to describe the current state of teamwork training in Oregon, to identify those critical teamwork training design activities and corresponding factors that are actually incorporated into existing teamwork training programs, and to determine the relationships between their use and the success of teamwork training programs. The study also assessed the degree to which identified barriers and other individual demographic variables affected both the critical design factors and perceived levels of teamwork training success. Research questions and hypotheses were presented in Chapter 1 (pp. 8-9). This chapter describes the design, development and implementation of the study, including the population and sample, questionnaire development, and procedures for data gathering and data analysis.

Population and Sample

The population for this study consisted of persons who design and deliver teamwork training in the workplace in Oregon. The exact number of persons fitting this description was unknown, since there are no registration or certification requirements such as for public school teachers. As a result of the uncertainty of defining the exact population, the decision was made to use a purposive sample (Babbie, 1992, Balian, 1982): individuals who belong to one of two major professional associations, The American Society for Training and Development (ASTD) and The National Society for Performance and Instruction (NSPI). Persons who join

such organizations, either on their own or through company sponsorship, were assumed to identify themselves with the training profession.

ASTD is the largest professional training association, with over 30,000 members nationally, and another 30,000 belonging to local chapters nationwide. The Oregon chapter had 488 members as of December 1993. ASTD'S current mission is to "provide leadership to individuals, organizations, and society to achieve work–related competence, performance, and fulfillment" (Rothwell, & Sredl, 1992. p. xxvii). The association's professional publications are Training and Development Journal and HRD Quarterly. ASTD focuses on human resource development (HRD), defined as "the integrated use of training and development, Organizational Development, and career development to improve individual, group, and organizational effectiveness" (Rothwell & Sredl, 1992. p.3).

Chartered in 1945 as the American Society of Training Directors (Miller, 1987), ASTD grew out of and remains closely allied with business and industry and industrial/organizational psychology. The association has traced its conceptual and theoretical roots to economics, psychology, management, communication, sociology, political science, education and the humanities (Rothwell & Sredl, 1992). Its basic beliefs are humanistic in nature.

NSPI, with 10,000 members internationally and 89 in Oregon as of December 1993, was chartered in 1962. Its mission is "to improve the performance of individuals and organizations through the application of Human Performance Technology" (1993-1994 Membership). Human Performance Technology (HPT) is "the process of selection, analysis,

design, development, implementation, and evaluation of programs to most cost–effectively influence human behavior and accomplishment" (Harless, in Geis, 1986). Instructional systems design is one technology of HPT. NSPI's professional publications are Performance and Instruction and Performance Improvement Quarterly.

Originally the National Society for Programmed Instruction, NSPI was created by professionals, many of them ASTD members, who were seeking a more focused, research–based organization. The conceptual and theoretical foundations of NSPI were educational and instructional psychology, systems, and communications. NSPI has firm roots in the traditional educational establishment, military training, and the workplace, including large corporations such as AT&T, Aetna, IBM, and Unisys (1993-1994 Membership).

A current mailing list was purchased from ASTD's Portland Metropolitan Chapter and provided by NSPI's Columbia Northwest Chapter. Each mailing list was reviewed and names of persons who had participated in instrument development were deleted. Thirty–three NSPI members also held ASTD membership so were deleted from the NSPI list to avoid duplicate mailings. The final mailing list consisted of 536 names.

Surveys were sent to all 536 names, a census rather than a random sample, primarily to ensure a sufficient number of returned surveys (Balian, 1982). First, there was no reason to believe that all members were currently employed as trainers, or if they were, that they were involved in teamwork training. A screening question was used on the survey to discriminate between those who were actively engaged in teamwork training and those who were not (Dillman, 1978). Secondly, responses to

surveys with this population have resulted in low response rates. Rothwell and Kazanas (1990) for example, surveyed 500 members of the Illinois chapter of ASTD and achieved a 30% response rate after two follow–up letters. Wedman and Tessmer (1993) received a 47% response rate from NSPI members in the Midwest. Here in Oregon, the Oregon Employment Division attained a 43% response rate for their survey of employer training practices, using both a postcard reminder and follow–up telephone calls (Oregon Works, 1993).

A concern must be noted with the sample. All persons surveyed were members of a professional group. Borg and Gall (1989) cautioned that use of professional directories or listings can lead to a biased sample as joiners may differ from non–joiners in a number of significant ways. Although the general finding is that respondents and non respondents do not differ on significant personality dimensions, there is evidence that persons more actively involved in the topic may respond and that responders may be better educated, especially when there is no personal contact between the researcher and the respondent (Rosenthal & Rosnow, 1991). Generalizing to the larger population of workplace trainers is, thus, problematic.

Questionnaire Development

Item Development

A literature search revealed that no existing instrument included the breadth of items planned for in this study. A preliminary list of 120 items was developed by the researcher based on a review of the literature and the Systems Approach to Teamwork Training framework presented in

Table 2.5, Chapter 2. Primary sources for general training and instructional systems design guidelines were Campbell (1988), Dick and Carey (1985) Gagné, et al. (1992), Goldstein (1993), Holding (1987). Kirkpatrick (1976), Richey (1986). Seels and Glasgow (1990), and Tannenbaum and Yukl (1992). Primary sources for items about the adult learner were Brookfield (1986), Darkenwald and Merriam (1982), Knowles (1984, 1987), Knox (1986), Merriam and Cafarella (1991), van der Kamp (1992), and Zemke and Zemke (1982).

Items relating specifically to teams and team process were based on conceptual and empirical sources (Cummings, 1981; Gladstein, 1984; Hackman & Morris, 1975; McGrath, 1984; Steiner, 1972; Sundstrom et al., 1990; Tannenbaum et al., 1992). Items integrating training design and teams were drawn from academic and practitioner literature on team training and team building (Boguslaw & Porter, 1982; Druckman & Bjork, 1991; Dyer, 1977; Dyer, 1984; Francis & Young, 1979; Liebowitz & DeMeuse, 1982; Parker, 1990; Swezey & Salas, 1992; Swezey, et al., 1992; Tannenbaum, et al., 1992; Woodcock, 1977; Woodman & Sherwood, 1980).

Finally, items relating to the barriers or situational constraints trainers might face while designing teamwork training were based on both ISD literature (Briggs, 1977; Seels & Glasgow, 1990; Wedman & Tessmer, 1993) and research on situational constraints (Peters & O'Connor, 1980).

The initial set of 120 items was organized into twelve categories, corresponding to major categories included in team and training process models. This initial list was first reviewed by three members of the researcher's graduate committee and revisions made to format, wording and organization.

Content Validity

Validity, the extent to which an instrument measures what it is supposed to measure (Gay, 1992), whether the measure is appropriate for the intended use (DeVaus, 1986), and the objectives of the user (Cascio, 1978) is a primary concern with any type of written survey instrument. Content validity, the degree to which the substance or content of the instrument represents the universe of possible items (Rosenthal & Rosnow, 1991; Weisberg & Bowen, 1977) was the primary type of validity examined in this study. Questions addressed in content validation relate to whether specific items are representative of the overall content and whether the overall content is adequately represented (Gay, 1992, Weisberg & Bowen 1977). According to Gay (1992), there is no formula or way to express quantitatively the degree of content validity. Rather it is determined through a logical, rational process.

To determine content validity, the initial set of 120 items was presented to an expert panel (Ebel, 1977; Gay, 1992), consisting of seven experts in both teamwork training and instructional system design (see Appendix A). Expert panels are a variant of the Delphi model, originally developed to create forecasts of the future (Weaver, 1971). Reliance on the subjective judgment of a panel of experts is recommended in the "absence of an accepted body of theoretical knowledge that would clearly single out one course (of action) as the preferred alternative" (Helmer, 1983, p. 56). The Delphi process is used to achieve consensus when experts can be expected to apply existing theories, intuition and insights from experience working on real problems (Helmer, 1983) to ill–defined problems that don't lend themselves to precise analytical techniques (Linstone, 1978). The

Delphi process is also used when time or cost preclude face–to–face interaction (Linstone, 1978).

Experts are typically used because it is assumed they are objective, are able to take into account new information and will approach a problem logically (Weaver, 1971). Criteria such as reputation, years of professional experience, number of publications, status among peers have been used to select experts. Self–ratings of expertise have also been found to be well enough correlated to actual performance to be used in selection (Helmer, 1983). For this study, experts were defined as those with formal training in instructional systems design and group dynamics, at least two years work experience designing teamwork training programs, and familiarity with Oregon businesses. All experts possessed graduate degrees; five of the seven experts had doctorates in psychology or education; two were employed as faculty at local community colleges; all had worked as external consultants to Oregon businesses.

The expert panelists were sent a packet including a cover letter explaining the process, a listing of the 120 items, and a comment sheet (see Appendix B). They were first asked to indicate if there was ambiguity or redundancy within the listing of items extracted from the literature. Each panel member was asked to respond to each item by (a) accepting the item, (b) rejecting the item, or (c) retaining the item with modification. Panel members were encouraged to contribute new items to address any perceived content gaps. Upon return of the first iteration, 21 items were reworded for clarity; four items were deleted and 19 items, including two open–ended questions, were added. Items were reassigned to categories and

a separate category relating to perceived success of teamwork training programs was created.

The second iteration consisted of the modified 135 item questionnaire. Panel members indicated if the item was worded clearly and rated each item on a five point Likert–type scale: (5) highest, first–order priority; absolutely critical and should nearly always be considered; (4) high, second order priority; relevant and significant; (3) priority item, third order priority; may be major determining factor; (2) low, fourth order; not a major determining factor. (1) lowest, fifth order priority; hard to determine impact. A priority rather than an importance scale was used since the panel had already stated in Round One that the item was critical for the design and delivery of teamwork training programs. The issue in this round was to rank these important items (W.N. Suzuki, personal communication, October 22, 1993). Since there was a high degree of consensus on the rankings, the decision was made to stop the Delphi after two rounds.

A minimum 4.0 level was used to determine items to be retained for the draft questionnaire. The cut–off point was set based on logic and pragmatics. First, a 4.0 rating ensured that the item was relevant and significant; second, a 4.0 was used to reduce the item pool so that respondents would not be overburdened (W.N. Suzuki, personal communication, October 22, 1993). Eighty–eight items met the 4.0 standard; 47 items were deleted. The number of categories for teamwork training activities was decreased to seven and items were reassigned, based partly on recommendations of the expert panel and partly on the decision of the researcher.

Pilot Testing

Twelve demographic items and one pre–screening question were added to gather general descriptive data on the individual and his/her organization. Questions relating to the individual trainer were level of involvement with team training, types of employees trained, primary job responsibilities, years experience in the HRD/training field, educational level, training/education in ISD and in teamwork training, and gender. In addition, data were gathered on the organization for which the individual worked, the percentage of employees serving on teams, and the type of industry, and number of employees.

The draft questionnaire was pilot tested to identify instrument deficiencies and to gather suggestions for improvement (Gay, 1987), following the Dillman's (1978) recommendations. A mock–up of the questionnaire, including the proposed cover letter, was submitted to other trained professionals: the researcher's major advisor; a business professor familiar with survey research and involved in a major field research project on team effectiveness; a statistical consultant; and staff at the Survey Research Center (SRC) of Oregon State University. Potential users of the data as well as potential respondents, four graduates of the training and development program at Oregon State University, participated in a talk–through of the items (Dillman, 1978; Zemke & Kramlinger, 1982).

Based on these two reviews, three items on teamwork training success were added and two other items were rewritten for clarity and to be consistent with the evaluation model incorporated into training design activities items. Additionally, six redundant training design activities were deleted. A general open–ended question, asking if the respondent had

anything else to add, was also added. Three items were reordered for a more logical flow and minor changes were made to format.

The revised draft instrument was reviewed again by the SRC and the major advisor, then administered to four workplace trainers, representative of the population (all were current or former members of either ASTD or NSPI) (Dillman, 1978; Zemke & Kramlinger, 1982). All were asked to recommend additional changes or improvements to the cover letter or to the questionnaire, to note ambiguities, and to time their completion rate. Based on this review, instructions for the items on training design activities were reworded and the Importance and Frequency scales were reordered to reduce the possibility of socially desirable responses. After minor changes in layout, the final instrument was finalized for data collection.

The final questionnaire included four sections. The first section consisted of 61 items grouped into five categories describing activities a workplace trainer might perform when designing and delivering teamwork training for the workplace. The first category, "Analyze the team and its environment" included 10 items relating primarily to macro–organizational factors, out of the control of the team and the trainer. The second category of 15 items, "Analyze the team and its task" related to specific input factors relating to the team itself, its design, structure, the task and technology available and to the team members. The third category, "Create complex and real-world training activities", included 13 items relating to general training design. The fourth category, "Consider the unique needs of the adult learner," included 13 items focusing on the adult learner in the team training situation. The final 10 items, "Encourage

continuous improvement," were designed to address evaluation of both the training design process and team performance.

Each item was accompanied by two, five–point Likert–response format scales asking respondents to assign a rating reflecting (a) how often they actually performed this task when designing and/or delivering teamwork training programs, (b) how important they judged the item to be for team training effectiveness.

The second section included 12 items, rated on a four–point Likert–type scale, describing organizational factors which might serve as barriers while designing or delivering teamwork training programs. The third section, representing the response variable, included nine items asking trainers to indicate their perception of the success of their teamwork training programs using a four point Likert–type scale. The final section included questions to ascertain demographic characteristics.

Likert–response format scales were used based on the nature of the respondents and the topics (Balian, 1982). Such scales are the most common scales in survey sampling (Orlich, 1978) and were assumed to be familiar to respondents. Scale anchors were based on formats provided by Orlich (1978). Five point scales were used for the Frequency and Importance ratings; this allowed a neither important nor unimportant response for the Importance scale. Such a response point allows the researcher to determine the relative strength of issues (Orlich, 1978). A four point scale was used for the Barriers items, on the advice of the SRC. The Success items included a four–point Likert–type scale as well as a don't know response.

The final questionnaire also included three open–ended questions, allowing respondents to describe their best and worst teamwork training experiences and to add anything else they wished to say about teamwork training. Twelve demographic questions, described earlier, were also included.

Research design and data gathering instruments were submitted for review and approval to the Human Subjects Board of the Research Office, to comply with University procedures. (see Appendix C).

Data Gathering

General procedures for obtaining a high response rate delineated by Dillman (1978) and confirmed by the SRC were followed. Mailing lists were purchased from the Portland Metropolitan Chapter of ASTD and provided by the Columbia Northwest Chapter of NSPI. Lists were reviewed to identify persons belonging to both professional organizations in order to eliminate duplicate mailings. The initial survey packet (see Appendix D), consisted of a personalized cover letter from the researcher on School of Education letterhead, a professionally printed copy of the questionnaire and a stamped, self–addressed return envelope. The cover letter explained the purpose and importance of the study and ensured respondents that all responses would be treated confidentially. An incentive in the form of a copy of the survey results was provided.

One week after the first mailing, a reminder post card (Appendix E) was mailed to all subjects. Two weeks later, a second copy of the questionnaire and second letter (Appendix F) was sent to all who had not yet responded.

Data Analysis

Returned surveys were reviewed, coded by the researcher, and entered directly into the data editor program of SYSTAT, converted to a transferable file and printed in hard copy for verification and correction of any data input errors. Initial descriptive statistics were also run on all variables to identify any missing or out of range data. All potential errors and missing data were cross–checked with the original questionnaires and corrected and adjusted where possible prior to data analysis. All analyses procedures were run on SYSTAT and its supplement, TESTAT.

Response Rate

Seldom does a mail questionnaire result in a 100% response rate. A key concern in any survey research, thus, is the degree to which responses which have been received can be generalized. Demographic variables of those who responded early, those who responded after the first follow–up, and those who responded late, after the second follow–up, were analyzed for differences or patterns which might indicate potential response bias. (Bouchard, 1976; Rosenthal & Rosnow, 1991). Analyses were also done on the basis of the screening question to determine demographic differences, if any, between those who responded and provide teamwork training and those who responded but did not provide such training. Since the data relative to the above questions was in the form of frequencies and percentages, a non–parametric test, the chi–square test, was used (Borg & Gall, 1989).

Common Method Variance

Common method variance refers to the problem that arises when trying to interpret associations among the measures of two or more variables gathered from the same respondents (Podsakoff & Organ, 1986). Basically, any error arising from the same source presumably contaminates all measures. Podsakoff and Organ recommended several different approaches to deal with this problem, beginning with obtaining multiple measures from multiple sources. That approach, however, was not feasible in this study. Two of their recommendations were followed. Scales were ordered so that questions about success (response variable) followed questions about teamwork training practices and barriers (explanatory variables). Secondly, Harmon's one–factor test was applied. In this procedure, all variables of interest were entered into a factor analysis procedure and reviewed to determine if a single factor, accounting for the majority of the covariance, emerged, indicating the possible presence of too much common method variance.

Open–ended Questions

Responses to open–ended questions were reviewed and coded according to an a priori descriptive coding scheme (Miles & Huberman, 1994). Primary coding categories followed the main categories in the questionnaire: Organizational Factors, Team and Task, Training Process, Training Outcomes, as well as a General category. Sub–categories were slightly modified after a review of the first thirty responses. Two independent raters read all responses and assigned codes. Inter–rater reliability was assessed by determining the percentage of agreement between the two raters. Inter–rater reliability was calculated at 89%.

Descriptive Statistics

Research questions 1, 2, 5, and 6 were studied through descriptive statistics. Basic descriptive statistics were computed on each variable of interest. Means, standard deviations, frequencies, percentages and rankings were computed for all items rated with Likert–type scales. Frequencies and percentages were calculated for all demographic variables.

Data Reduction

Research question 4 asked if any underlying factors described the activities that workplace trainers actually perform when designing teamwork training. Factor analysis (FA) was the primary method used to determine if the 61 items relating to frequency of performance, the 12 items relating to barriers and the 9 items relating to success could be described by a smaller number of factors. Factor analysis is a statistical method used to identify a limited number of underlying variables among a larger set of measures in order to reduce data (Kim, 1978).

The techniques of factor analysis basically examine the correlations or associations among variables. FA generates artificial, independent dimensions which correlate highly with several of the existing variables (Babbie, 1992). These variables are then assumed to be unidimensional, a factor in reliability (DeVaus, 1986). These factors are an empirical relationship only; meaning must be provided by the researcher (Babbie, 1992).

Limitations to the application of FA were imposed by the data. Nunnally (1978) recommended a minimum of 10 cases per variable to ensure that results are not simply due to chance, although others have said

that as few as five cases per variable may be sufficient (Bentler & Chou, 1987; Ford, MacCallum, & Tait, 1986). Since there were 61 frequency of performance items and only 134 cases, it was recommended (S. Maresh, personal communication, April, 1994) to apply FA to logically derived subsets of items. In this case, items had been sorted into five major categories by the expert panel and the researcher. As a result, FA was applied separately to each of the five frequency of performance categories, to the 12 items measuring barriers and to the nine items measuring success.

An initial review of the intercorrelation matrix for each set of items and computation of Bartlett's chi-square indicated that the correlations were statistically significant, and thus, amenable to FA (Weiss, 1976). Factor analysis followed the approach recommended by Ford, et al. (1986), and Rosenthal & Rosnow (1991), primarily examining a number of different solutions before deciding on the number of factors to retain. The principle components model with varimax rotation was used for this study (Ford, et al., 1986, p. 294).

Three methods were used to determine the number of factors to retain. Scree plots were examined for each set of items to determine where breaks or discontinuities occurred (Ford, et al., 1986; Kim & Mueller, 1978). The Kaiser method of retaining factors with eigenvalues of greater than one (Kim & Mueller, 1978) and Rosenthal and Rosnow's (1991) method of beginning with one factor and adding factors until an interpretable solution results were also used. The results achieved with Kaiser method of eigenvalues greater than one and building up from one factor tended to result in similar factor scales. Only items with an absolute factor value of

.40 or above (Kim & Mueller, 1978) were retained. Items which did not correlate with any of the factors were considered to be less reliable and were examined further to see if they should be eliminated from the scales.

Scale Reliability

After items were grouped into factors, a composite scale score was computed for each factor by averaging the item ratings. Next, the reliability of individual factor scales was determined. Reliability, the degree to which an instrument results in consistent, accurate and dependable rather than random responses can be assessed by retest methods, alternate forms, split–halves or internal consistency. The internal consistency measure was determined most appropriate for this study. It requires only one administration and is an accepted method in industrial/organizational research. Internal consistency refers to the degree to which items in a set are homogeneous, and for non–dichotomous data, can be assessed using a reliability coefficient such as Cronbach's alpha (Borg & Gall, 1989; Nunnally, 1978). Internal consistency can be assessed for the entire set of items or any subset of items. In this study, after items were grouped into factors, the coefficient of reliability was computed for each factor and used to determine if an item was to be retained or deleted. Generally, an alpha of .70 is recommended as an heuristic for determining if a scale is reliable (Nunnally, 1978).

Scale Correlations

Another method for assessing the appropriateness of item to scale assignment is to correlate each item with each scale (Nunnally, 1978). This method was used as a second check of the results of the factor analysis,

since, as has, been indicated, the 61 training activity items were not entered all together into the factor analysis procedure. The correlation matrix was reviewed to determine if items belonged to the scale to which they had been assigned by factor analysis, belonged to some other scale, or should be deleted. Correlations among scales were also examined to assess the independence of factors (Campion, et al., 1993).

Relationships Among Variables

Research question 3 and hypotheses one through six were explored through correlational procedures (Borg & Gall, 1989). The analysis proceeded from consideration of bivariate to multivariate relationships. To ensure comparability of measurement units during data analysis (Cohen & Cohen, 1983), ratings for frequency of performance, barriers and success measures were transformed to standard scores.

The relationships between the perceived level of importance of teamwork training and the frequency with which trainers actually performed these duties as expressed in individual item ratings, was explored through correlational statistics, adjusted for multiple comparisons. One–way analysis of variance was used to explore the relationships between each of the demographic variables and the success rating. Simple linear regression was used to explore the relationship between each of the factor scales and success, between each of the barrier scales and the factor scales and between the barrier scales and success.

Results of the bivariate analysis were used to help determine which of the explanatory variables might be most appropriately used in a multiple regression model. Since there was no guiding theory as to which of the factor scales or which combination might be the "best", a number of

approaches were used, including, as indicated above, a review of variables independently; diagnostics, including scatter plots and normal probability plots; and stepwise multiple regression.

CHAPTER 4

DATA ANALYSIS AND RESULTS

A self-administered questionnaire was developed and mailed to members of two professional training associations representing workplace trainers in Oregon. The purpose of this study was to describe the current state of teamwork training in Oregon, to identify those critical teamwork training design activities and corresponding factors incorporated into teamwork training programs, and to determine the relationships between their use, identified barriers, demographic variables and the success of teamwork training programs.

The results of the data analysis procedures outlined in Chapter 3 are presented here.

Respondents

Response Rate

Five hundred thirty-six questionnaires were mailed to members of two professional training associations in Oregon, the Portland Metropolitan Chapter of ASTD and The Columbia Northwest Chapter of NSPI. Three questionnaires were returned as undeliverable; two were found to be duplicates for a revised total of 531. Of these 531 questionnaires, 319 were returned for an adjusted response rate (Dillman, 1978) of 60%, a rate termed "good" for social survey research (Babbie, 1992).

Of the 319 questionnaires, 146 (46%) individuals responded affirmatively to a screening question, indicating that they provided teamwork training. Eleven of these questionnaires were determined

unsuitable for data input as they were missing more than 5% of item or demographic data (Cohen & Cohen, 1983); one questionnaire was received after the cut-off date for data entry, leaving 134 questionnaires for primary data analysis.

Of the remaining 173 returned questionnaires, 118 persons answered "no" to the screening question and provided demographic data. An additional 54 persons returned the questionnaire but did not provide demographic data. Of these 54, 16 returned the questionnaire with no comments; 16 wrote that they were in HRD/Training but did not provide teamwork training; 22 indicated they were not in the HRD/Training field, were looking for work in the HRD/training field or were retired from the field. One questionnaire was received after the cut-off period for data entry. Table 4.1 outlines the pattern of responses.

Table 4.1 Categories of Returned Questionnaires

Provide Teamwork Training?	Complete	Incomplete	Late	Total
Yes	134 (42%)	11 (17%)	1 (.3%)	146 (46%)
No	118 (37%)	54 (83%)	1 (.3%)	173 (54%)
Total	252 (79%)	65(20.4)	2 (.6%)	319 (100%)

Comparisons Between Teamwork Trainers and Non-Providers

Analyses were conducted to determine what differences, if any, existed between the 134 respondents who said they provided teamwork training and the 118 who indicated they did not provide such training. Significant differences were found in five categories of demographic variables, as indicated in Table 4.2. The largest difference was found in the

use of teams within the organizations for which individuals worked. Ninety-four percent of those who provided teamwork training worked for organizations which did use teams, while 59.8% of those who did not provide teamwork training worked for organizations which used teams (χ^2 [1,252] = 42.70, ρ=<.001). A related difference (χ^2 [5,252] = 32.14, ρ=<.001) was in the estimated percentage of employees who were members of teams. Of those who provided teamwork training, 17% indicated that 85 – 100% of the organization's employees belong to teams, while 16% of those who did not provide teamwork training indicated that no employees belonged to teams.

Differences were also found in the area of primary job responsibilities (χ^2 [5,252]=39.33; ρ=<.001). Persons who provided teamwork training classified themselves primarily as managers, directors or coordinators of HRD/Training (29.3%), and as consultants (27.8%). Persons who did not provide teamwork training classified themselves primarily as "other" (36.8%) or as instructor/teacher (21.9%). Among the other job responsibilities listed were general program, organization or human resource managers (36%) and technical professionals including software, engineering, and quality specialists (36%). The remaining 18% listed a variety of job responsibilities ranging from marketing and communications to social services and law enforcement.

Another significant difference (χ^2 [4,252]=14.93, ρ=.005) related to job responsibilities, was found in the area of experience in HRD/Training field. Over 79% of teamwork trainers indicated more than five years experience in the HRD/Training field compared to only 59.4% of the non-teamwork-trainers. Twelve (10%) of the non-teamwork trainers left this

question blank, some noting that they did not have any experience in the field.

The final significant difference (χ^2 [4,252] =13.30, ρ=.01) was found in the area of ISD training. Again, 13 (11%) non-teamwork trainers omitted this item, some noting they had no training whatsoever in the area. Thirty-one percent of the teamwork trainers identified their primary source of training as professional workshops, followed by on-the-job training (25%). Thirty-seven percent of non-teamwork trainers listed on-the-job training as their primary source of information, followed by academic programs (37%). Only 22% of non-teamwork trainers listed professional workshops as their primary source. Chi-square statistics and associated probabilities are reported in Table 4.2.

Table 4.2 Comparison of Demographic Variables: Teamwork Training Providers and Non-Providers

Demographic Variable	χ2	DF	p
Org uses teams	42.67	1	<.001**
% employees in teams	32.14	5	.<001**
Industry	10.55	9	.31
# of employees	5.21	4	.27
Primary job responsibilities	39.33	5	<.001**
Experience in HRD/Training	14.93	4	.005*
Education	1.39	4	.85
ISD Training	13.30	4	.01*
Team Training	3.14	4	.53
Sex	1.00	1	.32
Date of response	3.04	2	.22

* significant at p <.01
**significant at p <.001

Descriptive Demographics: Teamwork Trainers

The population of this study consisted of persons who provided teamwork training within the workplace in Oregon. Since the size and nature of this population was unknown, a purposive sample was used and questionnaires were mailed to all members of two professional training organizations in Oregon. The following section provides data about the demographic characteristics of the respondents who stated they provided teamwork training, including information about the organizations for which they worked.

Percentage of Employees Working as Part of a Team

As indicated in Table 4.3, the estimated number of employees working as part of a team within the respondents' organizations ranged from 0% to 100%, with a mode of 100% and an average of 59%. As reported in Chapter 2, nationwide, in organizations that have teams, 51% of employees are team members (Industry Report, 1994).

For purposes of subsequent data analysis, the data were collapsed into the following categories: 0%, 5 – 20%, 25 – 40%, 45 – 60%, 65 – 80%, and 85 – 100%. Based on the collapsed categories, 7.5% of the respondents worked for companies with no employees in teams; 13.4% of the respondent's organizations had between 5% and 20% of employees in teams; 14.1% of organizations had 25% to 40% of employees in teams; 10.4% of organizations had between 45% and 60%; 18.5% of organizations had between 65% and 80% of employees in teams; and 31.3% of organizations had between 85% and 100% of employees in teams.

Table 4.3 Estimated Percentage of Employees in Teams.

Percentage of Employees in Teams			
Percent	**N**	**%**	**Cum. %**
0 %	10	7.5	7.5
5%	2	1.5	9.0
10%	5	3.7	12.7
15 %	6	4.5	17.2
20 %	5	3.7	20.9
25 %	5	3.7	24.6
30 %	2	1.5	26.1
33 %	1	.7	26.8
35 %	3	2.2	29.0
40 %	8	6.0	35.0
50 %	11	8.2	43.2
60 %	3	2.2	45.4
65 %	3	2.2	47.6
67 %	1	.7	48.3
70 %	5	3.7	52.0
75 %	5	3.7	55.7
80 %	11	8.2	63.9
85%	2	1.5	65.4
90 %	11	8.2	73.6
95 %	5	3.7	77.3
99 %	1	.7	78.0
100%	23	17.2	95.2
not noted	6	4.5	99.7*
Total	134	99.7*	

* Total does not equal 100 % due to rounding.

Level of Involvement

The majority of respondents (54.5%) reported that they provided custom, not off-the-shelf or packaged teamwork training (see Table 4.4). Comments from the 24.6% who checked "other" indicated that these respondents provided a combination of packaged and custom training or that they established standards for consultants to customize training.

Table 4.4 Reported Level of Involvement with Teamwork Training

Involvement with teamwork training	N	%
1. Do not design or develop TWT	0	0
2. Deliver packaged TWT programs	10	7.5
3. Deliver TWT programs designed in-house	18	13.4
4. Design/deliver custom TWT programs	73	54.5
5. Other	33	24.6
Total	134	100

Categories of Employees Trained

As can be seen in Table 4.5, respondents to this survey provided teamwork training across all categories, with the largest percentage of trainers providing teamwork training to first-line supervisors (83.6%) and professionals (82.1%) and the fewest to students (21.6%), followed by salespeople (32.1%). Only 49.3% reported training production workers, and only 34.3 % of respondents reported providing teamwork training to executives. National and state industry surveys indicate that the amount and type of training differs across employee categories, with white-collar workers receiving the bulk of training time and expenditures (Carnevale, 1986; Oregon Works, 1993).

Table 4.5 Categories of Employees Trained

Category of Employee	N	%
1. Production workers	66	49.3
2. Customer service workers	84	62.7
3. Salespeople	43	32.1
4. Office/ administrative workers	103	76.9
5. Professionals	110	82.1
6. First-line supervisors	112	83.6
7. Middle managers	100	74.6
8. Senior managers	74	55.2
9. Executives	46	34.3
10. Students	29	21.6
11. Other	9	6.7

Industry Representation

The largest percentage of teamwork trainers (20.1%) worked for manufacturing companies; the smallest percentage (1.5%) for agriculture, forestry or mining organizations (see Table 4.6). Statewide, about 20% of Oregon employers are categorized as goods-producing and 80% as service-providing (Oregon Labor Trends, 1994).

Table 4. 6 Industry Representation

Industry	N	%
1. Manufacturing	27	20.1
2. Ag/forestry/mining	2	1.5
3. Communications/transportation/utilities	14	10.4
4. Wholesale/retail trade/hospitality	9	6.7
5. Finance/insurance/real estate	8	6.0
6. Health services	10	7.5
7. Business services	20	14.9
8. Education	22	16.4
9. Government/military	16	11.9
10. Other	6	4.5
Total	134	100

Number of Employees

As illustrated in Table 4.6, companies with less than 50 employees employed 26.9% of these trainers; 42.5% of the respondents reported working for companies of 500 or more employees. Oregon is primarily a state of small employers, with 43.8% of firms classified as having less than 50 employees and only 22.9% with 500 or more employees (Oregon Covered Employment and Payrolls, 1992). Nationwide data has indicated that the number of trainers in an organization is directly related to company size, with organizations of 99 or fewer employees reporting no trainers on staff (Carnevale, 1986). For subsequent data analyses, categories 1 and 2 have been combined.

Table 4.7 Number of Employees within Respondents' Organizations

Employees in Organization	N	%
1. LESS than 50	36	26.9
2. 50 – 99	5	3.7
3. 100 – 499	36	26.9
4. 500 – 999	13	9.7
5. 1000 or over	44	32.8
Total	134	100

Primary Job Responsibilities

The largest percentage of respondents (29.1%) reported major job responsibilities as manager, director or training coordinator, followed by consultant (27.6%). Of those who checked "Other", (15%) the majority indicated that training was just one part of their responsibilities. Five of this group categorized themselves specifically as organizational development consultants, while four indicated that although they provided teamwork training, they did not consider themselves a trainer.

Table 4.8 Respondent's Primary Job Responsibilities

Primary Job Responsibilities	N	%
1. Mgr/Director/Coordinator	39	29.1
2. Designer/Developer	7	5.2
3. Instructor	13	9.7
4. Generalist	17	12.7
5. Consultant	37	27.6
6. Other	20	15.0
No response	1	.7
Total	134	100

Experience in HRD/Training

This group of respondents was highly experienced, with 43.3% reporting more than ten years experience in the HRD/Training field and only 2.2% indicating they were newcomers to the field (see Table 4.9). For subsequent analyses, categories 1 and 2 have been combined.

Table 4.9 Experience in the HRD/Training Field

Experience	N	%
1. First year	3	2.2
2. One to four years	24	17.9
3. Five to ten years	47	35.1
4. More than ten years	58	43.3
No response	2	1.5
Total	134	100

Education

This group of respondents was also highly educated, with over 47% of the respondents possessing a Master's degree. Among the nine who checked "Other," were individuals with a high school diploma, an associate degree, or some college (see Table 4.10).

Table 4.10 Highest Level of Education

Education Level	N	%
1. Professional Certificate	6	4.5
2. Bachelor's	46	34.3
3. Masters	63	47.0
4. Doctorate	9	6.7
5. Other	9	6.7
No response	1	.7
Total	134	100

ISD and Teamwork Training

Two questions, summarized in Tables 4.11 and 4.12, were included to determine how respondents gained their knowledge or expertise in the training process, defined as ISD, and in the content area, defined as teamwork training.

Slightly more respondents (47%) gained their knowledge about ISD through formal means of professional workshops and academic programs than through informal means: on-the-job training and self-study (41.8%). The "Other" category, with 9.7% of the responses, included those who learned about ISD through networking, mentoring or a combination of methods.

Table 4.11 How Respondents Learned about ISD

ISD Learning Method	N	%
1. OJT	33	24.6
2. Self study	23	17.2
3. Academic programs	22	16.4
4. Workshops	41	30.6
5. Other	13	9.7
No response	2	1.5
Total	134	100

The percentages were reversed for teamwork training. In this case, the largest percentage (47.8%) learned through informal means of on-the-job training and self-study, while a slightly lesser percentage, (42.8%) learned about teams through formal study and professional workshops. Looking just at academic training, a larger percentage of respondents (16.4%) identified academic programs as their best source for information about ISD, while only 8.2% listed such formal programs as their primary source of knowledge about teamwork training.

Table 4.12 How Respondents Learned about Teamwork Training

Teamwork Learning Method	N	%
1. OJT	39	29.1
2. Self study	25	18.7
3. Academic programs	11	8.2
4. Workshops	46	34.3
5. Other	12	9.0
No response	1	.7
Total	134	100

Sex

Slightly more than half (56%) of the teamwork training providers responding to this survey were female.

Table 4.13 Respondent's Sex

Sex	N	%
Male	58	43.3
Female	75	56.0
No response	1	.7
Total	134	100.0

Based on the modal responses, the average teamwork trainer responding to this survey was a female with a Master's degree and more than ten years in the HRD/Training field, whose primary job responsibilities are as a manager, director, or coordinator of training for a manufacturing firm of over 1000 employees. She learned about both ISD and teams primarily through professional workshops and was most likely to provide customized teamwork training to first-line supervisors and professionals and least likely to salespeople and students.

Response Bias

To explore the potential for response bias, questionnaires were grouped into three categories based on the date received. Fifty-three questionnaires (39.6%) were received after the first mailing; 27 questionnaires (20.1%) after the second; and 54 questionnaires (40.3%) after the third mailing. No significant differences were found on any of the demographic variables as indicated in Table 4.14, providing limited support for a lack of response bias in the sample.

Table 4.14 Comparison of Demographic Variables By Date of Response

Demographic Variable	$\chi 2$	DF	p
Use of teams	1.77	3	.62
% employees in teams	49.20	42	.21
Level of involvement	4.23	6	.65
Industry	16.41	18	.56
# of employees	5.63	8	.69
Primary job responsibilities	18.47	14	.19
Experience	6.44	8	.60
Education	9.33	8	.31
ISD Training	5.07	10	.89
Team Training	5.90	8	.66
Sex	.04	2	.98

Descriptive Statistics: Teamwork Training Activities

Frequency of Performance

The first research question asked was, "What activities do workplace trainers actually perform when designing and/or delivering/facilitating teamwork training (TWT)?" Respondents indicated the frequency with which they actually performed each of 61 teamwork training activities on a five-point Likert-type scale with scale anchors of 1 = never, 2 = almost never, 3 = sometimes, 4 = nearly always, and 5 = always. Basic descriptive statistics (means, standard deviations, frequencies, percents and overall rank for each item) are reported in their entirety in Appendix G.

In general, trainers reported that they performed these activities relatively frequently. Average item ratings ranged from a high of 4.47 (Encourage all team members to participate in training) to a low of 3.18 (Evaluate the ability of the team to work together in the long term). Twenty-two items received mean ratings of over 4.00, indicating that trainers performed these activities nearly always; 30 were rated between 3.50 and 4.00; and only 9 were rated lower than 3.50.

As described in Chapter 3, the items on the questionnaire were clustered into five a priori categories, based on the literature review, recommendations of the Delphi panel, and judgment of the researcher. Following is a brief discussion of item ratings within each category. Bar charts are provided to illustrate relative ratings of items within each category.

The first category, "Analyze the team and its environment," included ten items relating to the concept of teamwork in the organization (e.g., Define what constitutes a team within the organization) and to

organizational factors which might influence teamwork (e.g., Consider the resources the team has available to achieve its goals). Such activities generally occur during the analysis phase of teamwork training design. As illustrated in Figure 4.1, mean item ratings ranged from a low of 3.48 (*SD* = 1.0) for the item, "Consider the impact of the organization's reward system on team work," to a high of 4.34 (*SD* = .84) for the item, "Involve team members in analyzing the team situation."

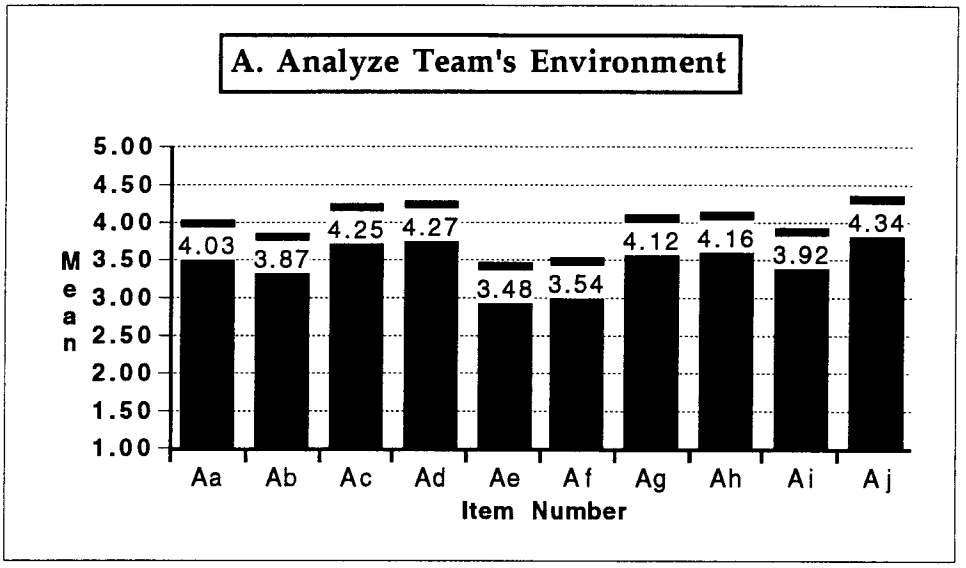


Figure 4.1 Mean Ratings for Frequency of Performance Measure: Analyze Team's Environment

The second category, "Analyze the team and its task," included 15 items that would also typically be part of the analysis phase of teamwork training design. The primary focus of these items, however, was on the impact of task, technology, team structure and team members on teamwork processes; performance strategies necessary to accomplish the team task; and existing team and individual competencies, attitudes and expectations. As shown in Figure 4.2, mean item ratings ranged from a low

of 3.27 (*SD* = .83) for the item, "Identify how technology might impact team processes" to a high of 4.20 (*SD* = .83) for the item, "Clarify individual team members' responsibilities on the team."

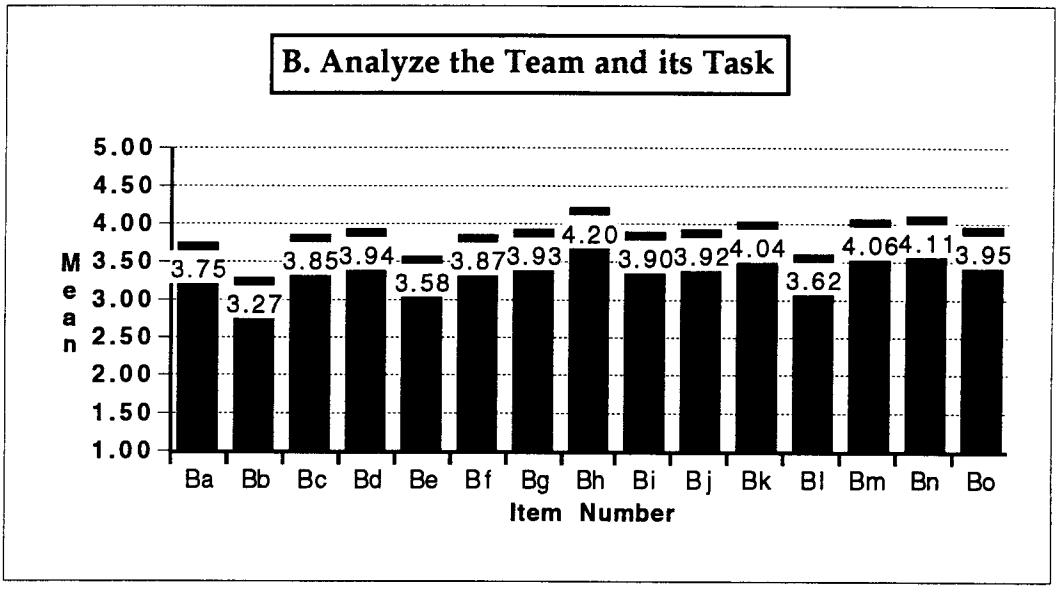


Figure 4.2 Mean Ratings For Frequency of Performance Measure: Analyze the Team and its Task

The 13 items in the third a priori category, "Create complex and real-world teamwork training activities," pertained both to general training principles (e.g., Prepare performance-based instructional objectives) as well as to activities unique to teams (e.g., Emphasize training on tasks that require team interaction). The means (see Figure 4.3) ranged from a low of 3.41 (*SD* = .91) for the item, "Provide activities so that team members understand the need to ask for help when necessary," to a high of 4.47 (*SD* = .73) for the item, "Encourage all team members to participate in training." This item was the highest rated of all 61 Frequency of Performance items on the questionnaire.

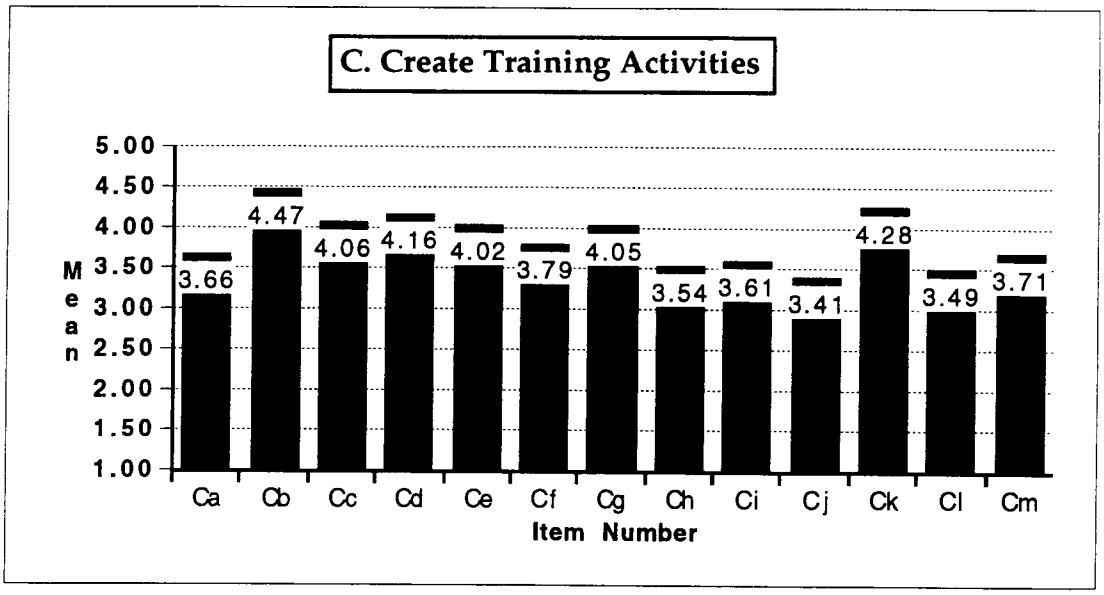


Figure 4.3 Mean Ratings for Frequency of Performance Measure: Create Training Activities

The fourth category, "Consider the unique needs of adult learners," also included many items which could be considered general training principles. The primary difference is that the items in the previous category were intended to be more task specific, while items in this category were intended to take into account individual differences (e.g., Relate training activities to past experiences of team members) and to the climate of the learning experience (e.g., Provide opportunities for teams to learn from mistakes in a non-threatening environment). The mean ratings of the 13 items in this category, (see Figure 4.4), ranged from a low of 3.64 (*SD* = .93) for the item, "Provide feedback to individual team members," to a high of 4.22 (*SD* = .84) for the item, "Pay attention to the social environment created by the instructor/facilitator interaction with trainees."

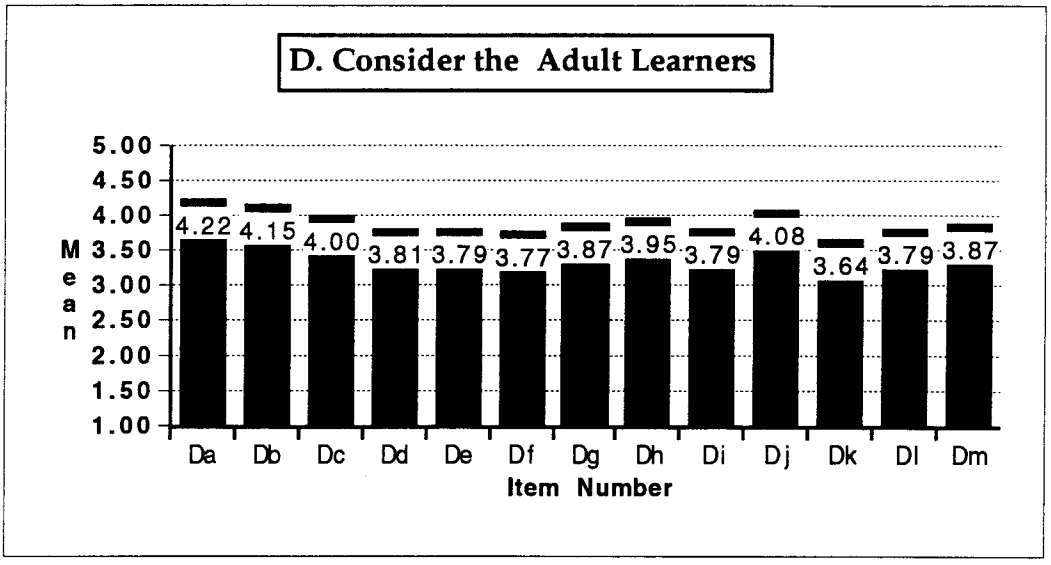


Figure 4.4 Mean Ratings for Frequency of Performance Measure: Consider the Adult Learners

The final category, "Encourage continuous improvement," contained 10 items relating to evaluation activities for both the training process and team performance. This category contained the lowest rated of all 61 items: "Evaluate the ability of the team to work together in the long run" (*M* =3.18, *SD* = 1.10). The highest rated item in the category, "Use trainee feedback to modify training programs," had a mean rating of 4.33 (*SD* = .85). Another highly rated item in the category, referring to gathering data about trainee satisfaction, had a mean rating of 4.11 (*SD*=.98). Figure 4.5 illustrates the mean ratings for items in this category.

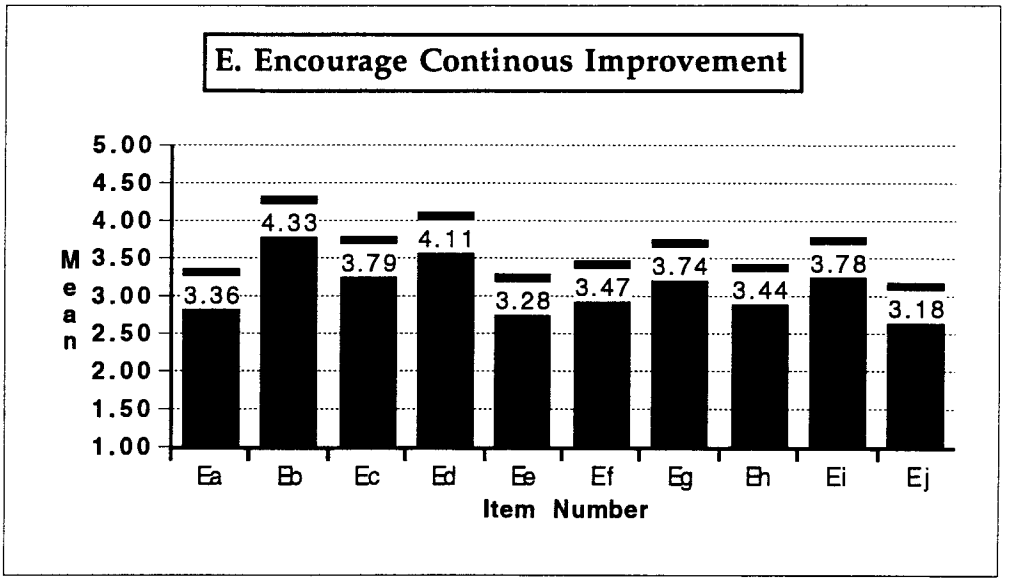


Figure 4.5 Mean Ratings for Frequency of Performance Measure: Encourage Continuous Improvement

Perceived Importance

The second research question was, "How do workplace trainers rate the importance of these TWT activities? Respondents were asked to indicate how important or critical they believed each of the 61 training activities to be for effective teamwork training, again using a five-point Likert-type scale with scale anchors of 1 = very unimportant, 2 = unimportant, 3 = neither important nor unimportant, 4 = important, and 5 = very important. Basic descriptive statistics (mean, standard deviation, frequency and percentage) are reported in Appendix H.

In general, trainers felt that the great majority of the activities were important for effective teamwork training. Mean item ratings ranged from a high of 4.62 (*SD* = .68) for the item, "Encourage all team members to participate in training," to a low of 3.68 (*SD* = .75) for the item, "Identify how technology might impact team processes", a more restricted range

than for Frequency of Performance. Fifty-eight of the 61 items were rated 4.00 or above, with only three rated below 4.0.

Some differences in relative ranking of items appeared when viewing the lowest and highest rated items in each a priori category. The lowest rated item in the category, "Analyze the team's environment," at 4.07 (*SD* = .88) was "Consider the impact of the organization's information system on teamwork." The highest rated items were "Assess management's willingness to implement team recommendations," (*M*= 4.60, *SD* = .61), and "Involve team members in analyzing the team's situation" (*M* = 4.60, *SD* = .64) (see Figure 4.6).

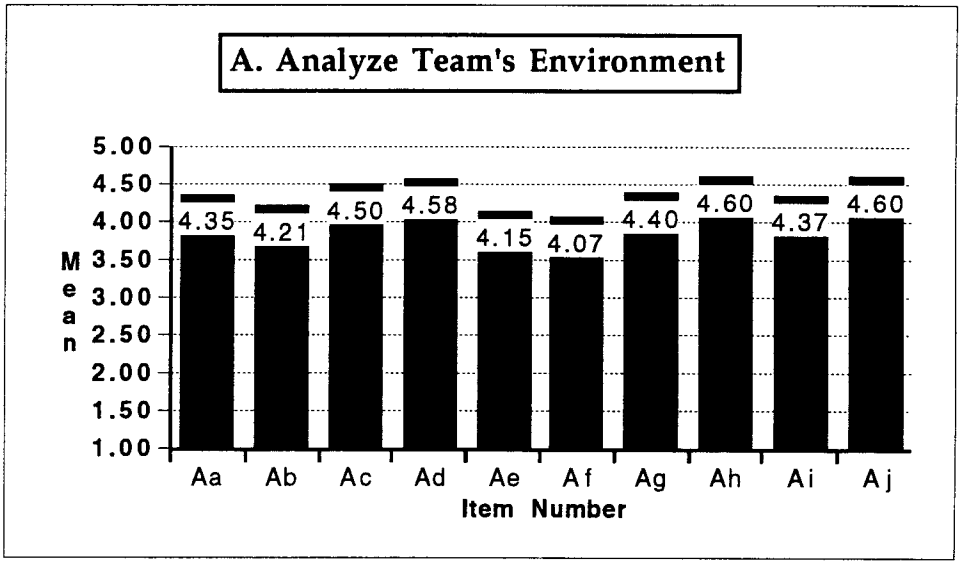


Figure 4.6 Mean Ratings for Importance Measure: Analyze Team's Environment

Mean ratings in the category, "Analyze the team and its task", are depicted in Figure 4.7. The item, "Identify how technology might impact team processes" was again the lowest rated item (*M*= 3.68, *SD* = .75) in the

category and the lowest rated item overall. The highest rated item was "Identify the team's conflict management strategies" (M = 4.49, SD = .62).

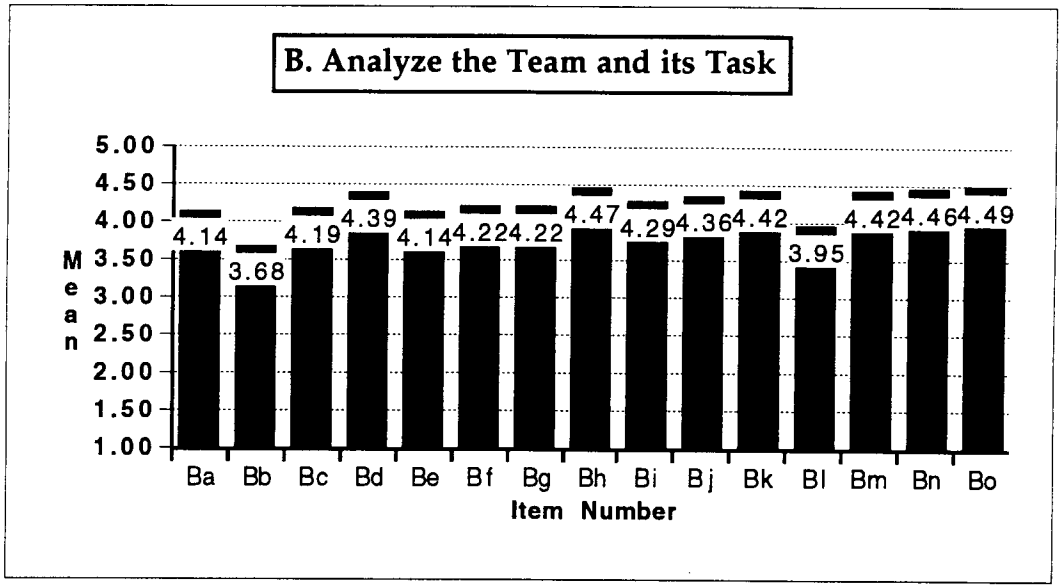


Figure 4.7 Mean Ratings for Importance Measure: Analyze the Team and its Task

The third category, "Create complex and real-world teamwork training activities" again contained the highest rated of all 61 items (see Figure 4.8). The item, "Encourage all team members to participate in training" received an overall mean rating of 4.62 (SD = .67). Similarly, the item rated lowest in the category in Frequency of Performance, was also rated lowest in the category in Importance. "Provide activities so that team members understand the need to ask for help when necessary" had a mean rating of 3.84 (SD = .88).

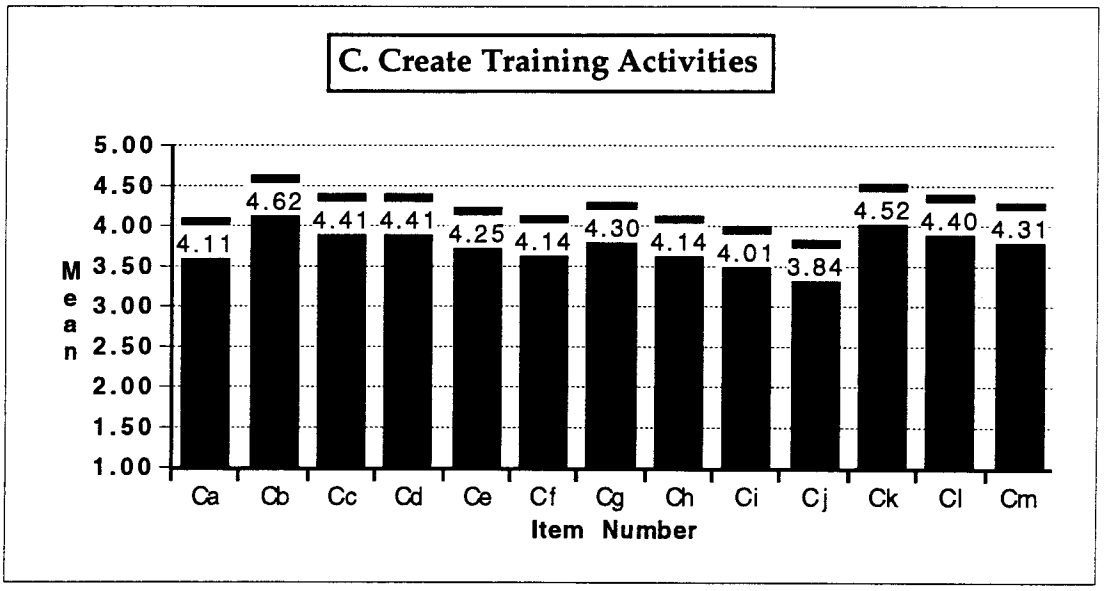


Figure 4.8 Mean Ratings for Importance Measure: Create Training Activities

As shown in Figure 4.9 on the next page, the lowest rated item in the fourth a priori category "Consider the unique needs of adult learners," was "Create opportunities for team members to accomplish simpler tasks before moving on to more complex tasks" (M = 4.13, SD = .82). The highest rated item in the category at a mean of 4.46 (SD = .67) was "Prepare team members to give constructive feedback to other team members." Three items tied with mean ratings of 4.43. These items referrred to allowing teams to learn from mistakes in a non-threatening environment, providing feedback on team performance, and preparing team members to accept constructive feedback. All items in this category were rated at over 4.00.

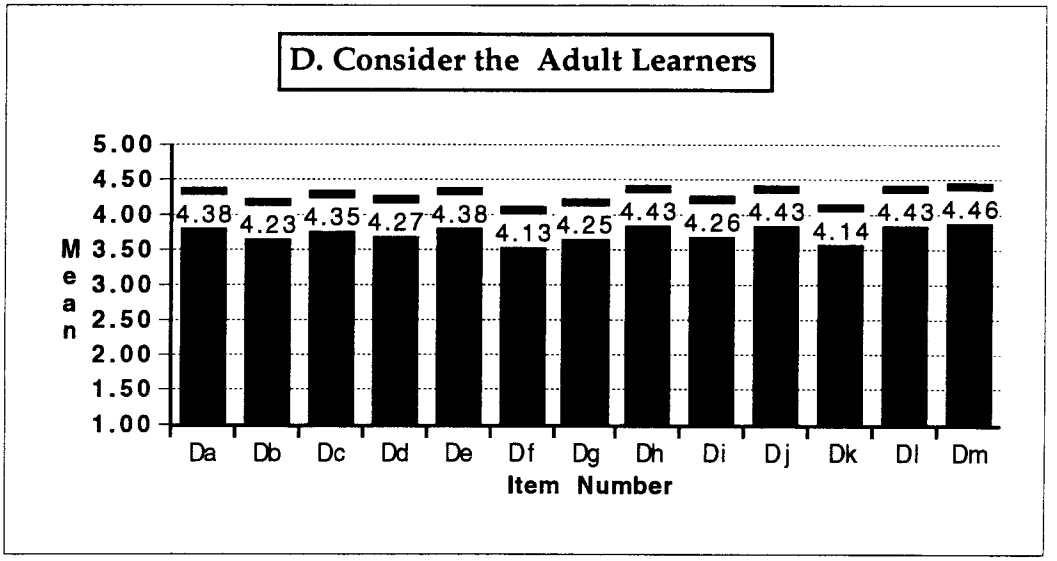


Figure 4.9 Mean Ratings for Importance Measure: Consider the Adult Learners

Mean ratings for items in the last category, "Encourage continuous improvement," are illustrated in Figure 4.10. The same items were rated the highest and lowest in the category as for Frequency of Performance. Thus " Evaluate the ability of the team to work together in the long term" was the lowest rated in the category (M = 4.03, SD = .97), but no longer the lowest rated of all 61. "Use trainee feedback to modify training programs" was again rated highest in the category at 4.61 (SD = .63).

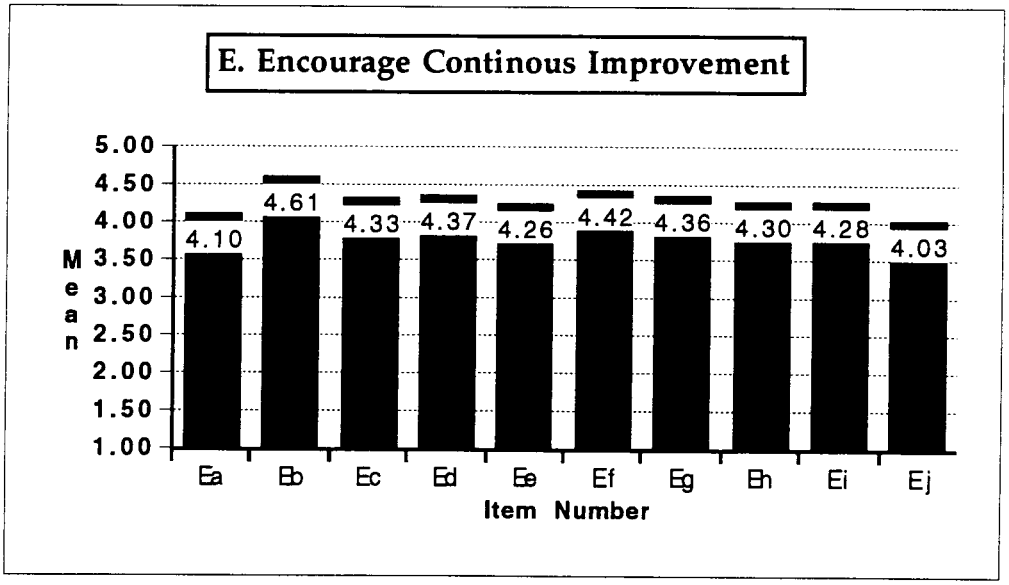


Figure 4.10 Mean Ratings for Importance Measure: Encourage Continuous Improvement

Relationship between Importance and Frequency

The third research question asked, "What relationship, if any, exists between activities performed and their perceived importance." The question addressed the issue of the relationship between the trainer's orientation or sentiment, represented by the Importance rating, and actions or judgment (Nunnally, 1978) represented by the reported frequency of performance. Product moment correlations are reported in Appendix I.

Correlations ranged from a low of $r = .29$ for the item, "Assess management's willingness to implement the teams' recommendations," to a high of $r = .76$ for the item, "Emphasize training on tasks that require team interaction."

Descriptive Statistics: Barrier Measures

Research Question 5 asked, "What barriers do workplace trainers face when providing TWT?" As discussed in Chapter 2, both the organizational and training literature recognized the potential influence of situational constraints on performance. In this context of this study, the situational constraints of interest were those which affected trainers' performance in the design, development and delivery of effective teamwork training programs.

This section of the questionnaire consisted of 12 items, rated on a four-point Likert-type scale, with scale anchors of 1 = not a barrier, 2 = not much of a barrier, 3 = somewhat of a barrier, and 4 = serious barrier. Descriptive statistics including means, standard deviations, frequencies, percentages and ranking are reported in Table 4.15.

Mean item ratings ranged from a low of 2.64 to a high of 3.26. The item that appeared to present the greatest barrier, relative to the other items, with a mean rating of 3.26 (*SD* = .85) was "Management expects a quick-fix solution." Two items received mean ratings of 3.25: "Managers/supervisors don't model effective teamwork skills" (*SD* = .70) and "Managers/supervisors resist changes in power relationships" (*SD* = .74). Indeed, the top five rated items, all rated at 3.0 or over, referred to management perceptions or actions relating to the implementation and support of teamwork within the organization.

On the other hand, two management-oriented items were rated below 3.00. "Teamwork is not part of management strategy"

Table 4.15 Mean Ratings, Frequencies and Percentages for Barrier Measures

Item	*Mean* *SD*	Frequency Percentage				Rank
		none	1	2	3	4	
a. Teamwork is not part of mgmt strategy	2.72 1.15		29 21.6	25 18.7	35 26.1	45 33.6	11
b. Mgmt doesn't support teamwork training	2.82 1.11	1 .7	22 16.4	30 22.4	31 23.1	50 37.3	9
c. Managers/supv resist changes in power relationships	3.25 .74	1 .7	2 1.5	18 13.4	58 43.3	55 41.0	3
d. Teamwork means different things to different people in the organization	2.92 .70		2 1.5	33 24.6	73 54.5	26 19.4	6
e. Managers/supvs don't model effective teamwork skills	3.25 .70		1 .7	18 13.4	62 46.3	53 39.6	2
f. Mgmt expects a "quick-fix" solution	3.26 .85	1 .7	7 5.2	14 10.4	50 37.3	62 46.3	1
g. Our reward systems don't support teamwork	3.19 .78	1 .7	5 3.7	16 11.9	61 45.5	51 38.1	4
h. The org's trng budget is insufficient.	2.89 .99	1 .7	14 10.4	30 22.4	45 33.6	44 32.8	7
i. I don't have enough time to develop customized teamwork training programs	2.72 .97	1 .7	18 13.4	32 23.9	52 38.8	31 23.1	10
j. We don't spend enough time providing teamwork training	2.89 .91	2 1.5	11 8.2	30 22.4	54 40.3	37 27.6	8
k. I don't have enough staff to provide teamwork training	2.64 1.00	3 2.2	21 15.7	34 25.4	47 35.1	29 21.6	12
l. There is little or no follow-up of trng on the job	3.08 .86	3 2.2	8 6.0	20 14.9	57 42.5	46 34.3	5

was the second lowest rated item at 2.72 (*SD* = 1.15) and "Management does not support teamwork training" was rated at 2.82 (*SD* = 1.11). It should be noted that these two items exhibited the largest variance of all 12 items.

Items relating specifically to traditional training resources, namely time, budget, and staff, were all rated below 3.00. The lowest rated item of all 12 items was, "I don't have enough staff to provide teamwork training" (*M* = 2.64; *SD* = 1.00)

Descriptive Statistics: Success Measures

Research question 6 asked, "How do trainers rate the success of their TWT?" Nine questions were included in this section of the questionnaire. Respondents indicated their perception of the success of their teamwork training programs on a four-point Likert-type scale with anchors of 1 = unsuccessful, 2 = somewhat unsuccessful, 3 = somewhat successful, and 4 = successful. A response category of don't know was also included, based on previous research that indicated that training evaluation is often limited to first-level reactions (Clegg, 1987; "Employee Training," 1986; Kirkpatrick, 1978). Descriptive statistics including means, standard deviations, frequencies and percentages for each of these items are reported in Table 4.16.

As indicated by the mean ratings, respondents rated their teamwork training programs as successful. Indeed, all items received mean ratings over 3.00; individual item ratings means ranged from a low of 3.13 (Team members are satisfied with their performance) to a high of 3.68 (Team members enjoy teamwork training activities).

Table 4.16 Mean Ratings, Frequencies, and Percentages for Success Measures

Item	*Mean* *SD*	Frequencies Percentages					
		none	1	2	3	4	Don't Know
a. I am satisfied with the results of our teamwork training.	3.23 .64		3 2.2	7 5.2	79 59.0	43 32.1	2 1.5
b. Team members enjoy teamwork training activities	3.68 .57		1 .7	4 3.0	32 23.9	96 71.6	1 .7
c. Team members find teamwork training useful	3.63 .59		1 .7	5 3.7	36 26.9	92 68.7	
d. Team members work together better after teamwork training	3.57 .61		1 .7	5 3.7	40 29.9	78 58.2	10 7.5
e. Team members communicate better after teamwork training	3.62 .56		1 .7	2 1.5	41 30.6	81 60.4	9 6.7
f. Team members are satisfied with their team performance	3.13 .57	1 .7	1 .7	10 7.5	86 64.2	29 21.6	7 5.2
g. Teams achieve performance goals	3.32 .62		1 .7	7 5.2	66 49.3	49 36.6	11 8.2
h. Teams contribute to org'l productivity after teamwork trng.	3.42 .67		1 .7	8 6.0	45 33.6	56 41.8	24 17.9
i. Managers are satisfied with teamwork trng.	3.29 .70		3 2.2	9 6.7	63 47.9	51 38.1	8 6.0

As illustrated in Figure 4.11, respondents took advantage of the don't know response category. Although all respondents had definite opinions regarding whether or not team members enjoyed teamwork training activities, 17.9% of the respondents indicated that they did not know if teams contributed to organizational productivity after training.

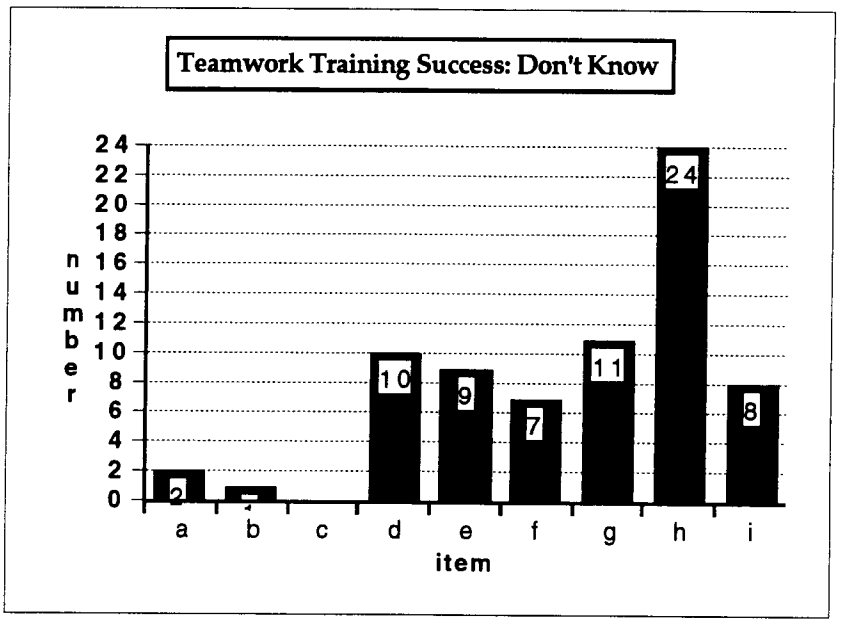


Figure 4.11 Number of Don't Know Responses for Success Measures

Open-ended Responses

The questionnaire included three open-ended questions:

Describe briefly the best teamwork training experience you have had. What made it the best?

Describe briefly the worst teamwork training experience you have had. What made it the worst?

What else would you like to tell us about teamwork training?

Eighty percent (n = 108) of the respondents wrote comments to open-ended questions one and two; twenty-nine percent (n = 39) responded to open-ended question three. In responding to these questions, respondents referred both to experiences they had had as a trainer and facilitator and as a training participant and learner.

Each open-ended question was read and coded according to an a priori descriptive coding scheme, based on questionnaire categories. Primary categories and subcategories were modified based on an analysis of the first thirty responses. Table 4.17 lists the primary categories, subcategories, and the number of responses coded as belonging to each subcategory for each open-ended question. Totals for each primary category are indicated in bold-face italic type. Primary coding categories were Organizational Factors, Team and Task, Team Members, Training Process, Training Outcomes, and General. As indicated previously, inter-rater reliability achieved 89%.

Results of the coding are summarized in Table 4.17. As can be seen, the largest percentage of responses overall (40%) referred to specific aspects of the training process, followed by comments referring to team members (24%), and organization-related issues (19%). Less than 3% of the comments overall related to training outcomes.

Of the 209 comments coded as Training Process, 68 addressed the importance of teamwork training being grounded in real world team issues. In general, those types of activities described as representing the Best teamwork training experiences engaged the team in experiential activities, relevant and easily transferable to real team issues. Teamwork training experiences described as Worst tended to be too theoretical, or too removed

Table 4.17 Summary of Responses to Open-ended Questions by Coding Categories and Subcategories

Category	Best	Worst	What Else	Cat. Total	% of Total
	#	#	#	#	
Organizational Factors	***28***	***55***	***14***	***97***	**19**
Mgmt Support/Partic.	19	30	9	58	
Link with Org. Strategy	5	12	1	18	
Org. Rewards		3		3	
Org. Resources	2	4		6	
Org. Climate	2	6	4	12	
Team and Task	***40***	***4***	***2***	***46***	**9**
Team Mission/Goals	19	1	1	21	
Team Design/Structure	11			11	
Team Task	3	1	1	5	
Team Communication	7	2		9	
Team Members	***51***	***62***	***12***	***125***	**24**
Team Member Readiness	15	1		16	
Voluntary/Mandatory		11	1	12	
Commitment	10	8	2	20	
Expectations for Training	6	7	2	15	
Conceptions of Teamwork	4	2	3	9	
Attitudes	16	33	4	53	
Training Process	***108***	***78***	***23***	***209***	**40**
Needs Assessment	5	7	5	17	
Objectives	4	6	2	12	
Real World/Experiential	39	22	7	68	
Individual Differences	13	5	3	21	
Facilitator	15	16	1	32	
Follow-up	4	5	2	11	
Resources	16	12	1	29	
Trng Environment	8	3	2	13	
General	4	2		6	
Training Outcomes	***13***	***5***		***18***	**3**
General	***11***	***8***	***6***	***25***	**5**
Overall Total	**251**	**212**	**57**	**520**	**100**

from the team's real life problems. Often, the lack of relevance appeared to stem from standardized training programs or activities, rather than activities adapted to the needs of a particular team.

Thirty-two comments in the Training Process category addressed the role and qualifications of the teamwork training facilitator. It should be noted that the first draft of the questionnaire included an item on the skills of the facilitator in the barrier section. This item was not, however, included in the final questionnaire, based on the response of the Delphi panel. In general, respondents judged teamwork facilitators and instructors on two criteria: the extent to which they modeled good teamwork skills and the extent to which they followed good adult learning principles.

The category of Team Members received the second highest number of comments with 24% (n = 125) of the overall comments. Best experiences tended to involve team members who were committed to the team concept, willing to learn new ways of working together, and realistic about the efforts. Worst experiences involved hostile team members who had not bought in to the concept of teamwork, and who did not possess basic communication or group process skills. In some cases the hostile attitudes apparently stemmed from management actions such as mandates to attend training, organizational downsizing, or restructuring.

The primary category, Organizational Factors, received the third highest number of comments (n = 97). The importance of management support for and participation in teamwork training garnered the most comments in this category (n= 58). Best experiences confirmed the necessity of management at all levels being willing to support the concept of teamwork with necessary resources, and to model it in their own actions.

Worst experiences focused on managers who stated support for teams and training but did not follow through with resources or participation or who actively resisted efforts. While 19 comments were coded as Best experiences, 30 comments were coded as Worst experiences.

Data Reduction

Frequency of Performance

Factor analysis (FA) was used to reduce the number of items and to group them into subsets for subsequent data analysis procedures. Appendix J lists factor loadings for each frequency of performance item, eigenvalues for each factor scale and percentage of total variance explained by each factor scale. Based on the factor analysis, eleven scales were derived from the Frequency of Performance items.

Two factors, explaining 47.2% of the variance, were derived from the 10 items in the category, "Analyze the team's environment." The first factor, Organizational Infrastructure, included six items referring to relatively objective macro-organizational factors outside the control of the team such as the linkage of the teams' goals with strategy, reward and information systems, resources, other groups with which the team must interact and management's willingness to implement team's recommendations. The three items in the second factor, Teamwork Orientation, referred to more abstract factors, including cognitive understandings of teamwork as manifested by the use of common definitions and models of teamwork and the analysis of organizational factors and a subtle, yet direct manifestation of organizational support for teamwork, involving team members in analyzing their situation.

Three factors, explaining 56.8% of the total variance, were derived from the 15 items in the category, "Analyze the team and its task." The first factor, Performance Strategies, consisted of five items and explained 22.19% of the variance. Items loading on this factor referred to the assessment of generic behaviors and competencies needed for successful teamwork such

as leadership, communication, problem-solving, decision-making, and conflict management strategies. The second factor, Task Requirements, explained 17.82% of the variance. It included six items which focused on the assessment of the impact of task, technology and work flow, and the resultant need for coordination on team processes and performance. The final category, Individual Attributes, included five items, explained 16.83% of the variance, and referred to the assessment of individual team member's skills and attitudes.

One item, "Identify the specific teamwork skills required by the team's task" loaded on both Factors 2 and 3. Logically, the item could be interpreted to refer both to the impact of the task on required skills as well as to the competencies possessed by individual team members; thus, the item was incorporated into both factor scales.

Two factors, explaining 49.1% of the total variance, were derived from the 13 items in the category, "Create complex and real-world teamwork training activities." The first factor, comprised of 9 items explained 26.80% of the variance. This factor was titled Performance-Based Training since the items encompassed core generic training principles (e.g., preparing instructional objectives and creating relevant experiences) as well as core group process/team building principles (e.g., clarifying team and individual goals and responsibilities) necessary for effective teamwork. The second factor explained 22.33% of the variance and consisted of 4 items. These items reflected activities which would have the most impact or be most likely to occur on the job, with or without active training intervention. As a result, the this factor was termed On-the-job Training.

Two factors, explaining 56.7% of the total variance were derived from the 13 items in the category, "Consider the unique needs of adult

learners." The first factor of eight items explained 28.62% of the variance and was titled Learner-centered Training since these items described core adult learning principles: relating training to past experience; accommodating individual differences, and encouraging critical reflection. Five items loaded in the second factor, explaining 28.09% of the variance. The central focus of these items was on feedback in a non-threatening environment; thus, the factor was titled Constructive Feedback.

Finally, two factors, explaining 60.8% of the total variance were derived from the 10 items in the category, "Encourage continuous improvement." The five items loading on the first factor, explained 33.80% of the total variance, and referred to actual team performance; thus, it was titled, Team Performance Evaluation. The remaining five items, which explained 27.02% of the total variance, referred primarily to evaluation of the teamwork training process; thus, this factor was titled Training Process Evaluation.

Barriers

As indicated in Table 4.18, three factors explained 60.41% of the total variance of the Barrier items. The first factor, Lack of Organizational Support, included five items, explaining 25.23% of the total variance. Items in this factor referred to system-wide manifestations of organizational support. The second factor, Insufficient Training Resources, consisted of four items, explaining 21.89% of the total variance. Items referred to resources specific to training design and delivery: training budget, development and delivery time, and training staff. The two items loading on the third factor explained 13.29% of the total variance. Items differ from the first factor in that they appear to refer to individual managers actually

practicing what they espoused. As a result, this factor was dubbed Dysfunctional Management Practices.

One item, "There is little or no follow-up of training on the job," loaded moderately on all factors, but did not load at .40 or greater on any factor, so was eventually dropped from further analysis.

Table 4. 18 Factor Loadings and Scale Reliabilities: Barrier Measures

Item	Bar1	Bar2	Bar3
a. Teamwork is not part of management strategy	**.88**	.13	-.03
b. Management doesn't support teamwork training	**.89**	.05	-.08
c. Managers/supv resist changes in power relationships	**.63**	.11	.36
f. Management expects a "quick-fix" solution	**.63**	.22	.27
g. Our reward systems don't support teamwork	**.51**	.03	.26
h. The organization's trng budget is insufficient	.30	**.65**	-.15
i. I don't have enough time to develop customized teamwork training programs	-.06	**.81**	.21
j. We don't spend enough time providing teamwork training	.25	**.78**	-.00
k. I don't have enough staff to provide teamwork training	-.10	**.81**	.16
e. Managers/supvs don't model effective teamwork skills	.43	-.06	**.70**
d. Teamwork means different things to different people in the organization	.02	.25	**.83**
l. There is little or no follow-up of training on the job	.28	.39	.22
Eigenvalues	3.94	2.08	1.23
Percentage of total variance explained	25.23	21.89	13.29
Cronbach's alpha	.80	.79	--

Success

One factor, explaining 49.2% of the variance, with an eigenvalue of 4.43, was derived from the nine items in the Success measure. As can be seen from Table 4.19, item loadings ranged from a low of .64 to a high of .77.

Table 4.19 Factor Loadings and Scale Reliability: Success Measure

Item	Factor 1
a. I am satisfied with the results of our teamwork training	.68
b. Team members enjoy teamwork training activities	.70
c. Team members find teamwork training useful	.73
d. Team members work together better after teamwork training	.77
e. Team members communicate better after teamwork training	.72
f. Team members are satisfied with their team performance	.64
g. Teams achieve performance goals	.68
h. Teams contribute to org'l productivity after teamwork trng	.72
i. Managers are satisfied with teamwork trng	.67
Eigenvalue Percentage of total variance explained	4.43 49.17
Cronbach's alpha	.87

Scale Reliabilities

Factor scales were computed by summing across all items assigned to a factor and computing the mean value of these summations. These composite measures appeared to be reliable as the Cronbach alpha estimates, an internal consistency measure of reliability, ranged from .61 to .87, indicating that some scales are more reliable than others. All except one, Teamwork Orientation, met the .70 level recommended by Nunnally (1978). A review of Cronbach's alpha excluding individual items did not indicate the need to eliminate any items. Appendix J lists Cronbach's alpha for each factor scale generated from the Frequency of Performance items. Cronbach's alpha levels for the three factors derived from the Barrier measure and the Success factor scale are listed in Table 4.18 and Table 4.19, respectively.

Common Method Variance

All Frequency of Performance, Barrier, and Success items were entered together into a factor analysis procedure (principle components with varimax rotation) to determine if one factor accounted for the majority of the variance, indicating the possibility of common method variance. Convergence was not obtained after 75 iterations. This could be seen as limited evidence that common method variance did not exist, or it could, perhaps, be explained as a result due to chance because of the ratio of variables to cases.

Item to Scale Correlations

Since all 61 frequency of performance items could not be entered into FA together, items were correlated with each factor scale as a limited confirmation of the FA results (Nunnally, 1978). As can be seen from Appendix K, the highest correlation for each of the 61 Frequency of Performance items was to the factor scale to which the item had been assigned by factor analysis, relative to all other factor scales. It can, also be seen, however, that some items are highly correlated with other factor scales, thus limiting the independence of the factors.

Factor Scales

Based on review of factor analysis, coefficient alpha, and item to scale intercorrelations, the following fifteen scales, termed Critical Design Factors, were used in subsequent data analysis.

Critical Design Factors

A1 Organizational Infrastructure

A2 Teamwork Orientation

B1 Performance Strategies

B2 Task Requirements

B3 Individual Attributes

C1 Performance-Based Training

C2 On-the-job Training

D1 Learner-Centered Training

D2 Constructive Feedback

E1 Team Performance Evaluation

E2 Training Process Evaluation

Barriers

Bar1 Lack of Organizational Support

Bar2 Insufficient Training Resources

Bar 3 Dysfunctional Management Practices

Success

Correlation Matrix

Correlations among factor scales give some indication as to whether or not the scales are independent (Campion, et al., 1993). As indicated in Table 4.20, zero-order correlations among scales ranged from .25 to .74, indicating that there was moderate to high correlation among the eleven factor scales derived from the 61 Frequency of Performance items. Multicollinearity, as indicated by the high degree of correlations among the factor scales, can create problems when using multiple regression procedures. In such cases, Cohen and Cohen, (1983) recommended three

Table 4.20 Correlation Matrix: Factor Scales, Composite Training Activity Scale and Success Scale.

Factor	*M*	*SD*	A1	A2	B1	B2	B3	C1	C2	D1	D2	E1	E2	Freq	Br1	Br2	Br3	Bar	Suc
A1	3.91	.62	76																
A2	4.12	.58	46	--															
B1	4.01	.69	46	48	--														
B2	3.77	.59	66	50	53	--													
B3	3.85	.67	47	39	54	60	--												
C1	3.96	.59	48	64	64	53	48	--											
C2	3.66	.69	50	43	45	50	50	63	--										
D1	3.92	.65	46	53	47	43	39	74	62	--									
D2	3.86	.72	45	45	52	40	43	63	59	62	--								
E1	3.41	.84	44	25*	38	43	41	45	52	39	52	--							
E2	3.87	.72	43	44	49	47	47	67	60	61	57	58	--						
Freq	3.85	.49	71	67	73	73	75	84	78	76	77	68	79	--					
Br1	3.05	.70	16**	04**	12**	10**	11**	05**	11*	07**	07**	08**	14**		--				
Br2	2.79	.75	-06**	-12**	-03**	02**	-06**	-15**	-04**	01**	-08**	12**	02**	-04**	27	--			
Br3	3.08	.59	-15**	-15**	-03**	-17**	-06**	-05**	-07**	04**	-04**	-04**	-02**	10**	37	23*	--		
Barrier	2.97	.49	00**	-02**	-10**	03**	-01**	00**	-07**	-04**	05**	-02**	08**	06**	76	73	69	--	
Success	3.43	.44	23*	19*	20*	28	30	32	28	29	34	13**	31	35	06**	-10**	-20*	-10**	--

N=134

Decimals omitted for correlations

All correlations significant at $\rho < .01$ unless otherwise indicated

* = $\rho < .05$

** = $\rho > .05$

possible alternatives: formulating some casual hypotheses to explain the intercorrelation, combining the scales into a single index or dropping one or more peripheral variables. The lowest correlation (r = .25) was between Teamwork Orientation and Team Performance Evaluation, possibly indicating no perceived connection between a conception of teamwork and the process of evaluating the impact of teamwork training, or that an orientation to teamwork is not necessarily transformed into more objective assessment of teamwork performance. The highest correlation (r = .74) was between Performance-based Training and Learner-Centered Training. Such a high correlation may be limited confirmation of the assertion that performance-based training is learner-centered. It could also reflect the fact that these items relate most specifically to actual training experiences that a trainer/facilitator designs or manages.

In the development of this questionnaire, multiple items were not constructed in an attempt to describe clearly defined and independent constructs. Rather, items were designed to represent a broad and relatively comprehensive description of activities a trainer may undertake when providing teamwork training programs. It was not the intent to derive "pure" scales from the factor analysis. Factor analysis was applied primarily to reduce the number of items under consideration in subsequent analyses. Since the Frequency of Performance subscales were highly correlated, a composite Frequency of Performance score was computed and used for subsequent analyses in addition to the separate factor scale scores.

It should also be noted that correlations among the Frequency of Performance factor scales and Barrier factor scales were not significantly correlated, indicating that these items were relatively independent of one another, measuring different constructs. The correlations among the factor

scales of the barrier items themselves are also lower than among the Frequency of Performance factor scales. Two of the three correlations are, however, significant at a $\rho = <.01$ level; thus a composite Barrier scale was also computed.

Regression Analyses

Hypotheses 2,3,4, and 5 addressed the relationships of various variables on the perceived success of teamwork training programs. The specific hypotheses to be addressed were as follows:

H_2 There is no relationship between the critical design factors and the perceived levels of teamwork training success.

H_3 There is no relationship between the perceived barriers and the critical design factors.

H_4 There are no relationships between the perceived barriers and the perceived level of teamwork training success.

H_5 There is no interaction between the critical design factors and the barriers on the perceived levels of teamwork training success.

Regression analysis, using SYSTAT, was used to examine these relationships. Diagnostics, including a review of the residuals and normal probability plots were undertaken to ensure that assumptions for regression were met. Based on the diagnostics, three cases were identified as outliers. According to Cohen and Cohen (1983), if outliers are less than 1% or 2% of *n* and if they are not very extreme, they should probably be left alone. Schaefer (personal communication, February 2, 1991) recommended examining outliers, and depending on their nature, computing regressions with and without the outlying cases and reporting both sets of data. A review of the outlying cases indicated that they were the result of a large number of <u>don't know</u> responses and/or extremely low ratings on the response variable. Regression results are reported both for the full set of 134 cases and for a reduced set of 131 cases, omitting the three outliers.

Regression analyses proceeded through three phases. In each phase, the Success score served as the response variable and the Critical Design Factors scale scores and the composite Performance and Barrier scores served as explanatory variables. First, simple linear regressions were computed for each factor scale and composite score separately. Next, multiple regressions were computed using all factor scales and composite measures. Finally, the stepwise multiple regression procedure was used to identify the "best set" of explanatory variables.

Table 4.21 lists the Beta coefficients, standard error of the coefficient, R^2, t-statistic and ρ value for each separate factor scale, each composite measure and for the interaction of the composite measures for the full set of 134 cases. As can be seen, the Success rating was significantly and positively affected by all of the critical design factor scales, except Team Performance Evaluation (ρ=.15). In terms of R^2, those which explained the greatest amount of the variance of the perceived Success rating are Constructive Feedback which explained 11% of the variance of the Success rating; Performance-Based Training, which explained 10% of the variance, and Training Process Evaluation, Individual Attributes, and Learner-Centered Training, each of which explained 9% of the variance. Among the barrier scales, only Dysfunctional Management Practices was significantly, but negatively, related to the ratings of Success, although it explained only 4% of the variance in the Success rating.

The composite Performance scale was also significantly related to Success, accounting for 12% of the variance in the Success rating. Neither the composite Barrier scale nor the interaction between the composite

Performance scale and the composite Barrier scale were significant contributors to the Success rating.

Table 4.21 Simple Linear Regression: All Cases

Explanatory Variable	β	SE	R^2	t	ρ two-tailed
A1 Organizational Infrastructure	.16	.23	.05	2.67	.01*
A2 Teamwork Orientation	.15	.06	.04	2.28	.02*
B1 Performance Strategies	.13	.05	.04	2.36	.02*
B2 Task Requirements	.20	.06	.08	3.32	.00*
B3 Individual Attributes	.19	.05	.09	3.58	.00*
C1 Performance-Based Training	.24	.06	.10	3.94	.00*
C2 On-the-Job Training	.18	.05	.08	3.41	.00*
D1 Learner-Centered Training	.20	.06	.09	3.52	.00*
D2 Constructive Feedback	.21	.05	.11	4.13	.00*
E1 Team Performance Evaluation	.07	.04	.02	1.34	.15
E2 Training Process Evaluation	.19	.05	.09	3.72	.00*
Bar1 Lack of Organizational Support	.04	.05	.00	.70	.48
Bar2 Insufficient Training Resources	-.06	.05	.01	-1.15	.25
Bar3 Dys. Mgmt. Practices	-.15	.06	.04	-2.35	.02*
Composite Performance	.35	.08	.12	4.29	.00*
Composite Barriers	-.10	.09	.01	-1.66	.25
Performance x Barriers	.14	.08	.02	1.77	.08

n=134
*ρ = <.05

Table 4.22 lists the Beta coefficients, standard error of the coefficient, R^2, t-statistic and ρ value for each separate factor scale, each composite measure and for the interaction of the composite Performance and Barrier measures for the reduced set of cases, omitting the outliers. As can be seen,

omitting the outlying cases tended to change the beta weights, reduce the standard error of the coefficient, and increase both R^2 and the significance level. Although Success was now found to be significantly affected by Team Performance Evaluation (ρ = .01), this factor scale explained only 6% of the variance. As with all 134 cases, this factor scale had the least effect of all critical design variables on the rating of Success.

The factor scales, Performance-based Training and Constructive Feedback again had the strongest effect on the Success rating. These two factor scales were the most positively affected by the omission of the three outliers, gaining the most in terms of R^2. R^2 for Performance-based Training increased from 10% to 24%; Constructive Feedback from 11% to 21%. Learner-Centered Training and Training Process Evaluation both explained 17% of the variance. Individual Attributes, showed only a modest gain in R^2, explaining 12% of the variance in the Success rating.

Overall, the results suggested that composite Performance accounted for approximately 25% of the variance in the Success rating. Success was not significantly influenced by either the composite barrier scale (ρ = .14) nor the interaction of performance and barriers (ρ =.41).

Table 4.22 Simple Linear Regression: Reduced Set of Cases

Explanatory Variable	β	SE	R^2	t	ρ two-tailed
A1 Organizational Infrastructure	.27	.06	.12	4.15	.00*
A2 Teamwork Orientation	.26	.06	.11	4.09	.00*
B1 Performance Strategies	.22	.07	.08	3.31	.00*
B2 Task Requirements	.29	.06	.14	4.66	.00*
B3 Individual Attributes	.26	.06	.12	4.12	.00*
C1 Performance-Based Training	.38	.06	.24	6.39	.00*
C2 On-the-Job Training	.31	.06	.16	4.97	.00*
D1 Learner-Centered Training	.32	.06	.17	5.15	.00*
D2 Constructive Feedback	.36	.06	.21	5.80	.00*
E1 Team Performance Evaluation	.18	.07	.06	2.78	.01*
E2 Training Process Evaluation	.33	.06	.17	5.19	.00*
Bar1 Lack of Organizational Support	.03	.07	.00	.49	.62
Bar2 Insufficient Training Resources	-.13	.07	.03	-1.89	.06
Bar3 Dys. Mgmt. Practices	-.13	.07	.03	-1.94	.05*
Composite Performance	.39	.06	.25	6.53	.00*
Composite Barriers	-.10	.07	.02	-1.50	.14
Performance x Barriers	.05	.06	.00	.82	.41

n=131
ρ = <.05

Simple regressions help explain the singular impact of each explanatory variable on the Success rating. In reality, however, these variables act in concert. Therefore, to address the potential influence of more than one explanatory variable on the Success rating, multiple regression procedures were used, again with the SYSTAT computer

program. To begin, all Critical Design and Barrier factor scales were entered into a full model as explanatory variables, first for the full set of 134 cases and then for the reduced set of 131 cases. Table 4.23 lists the beta weights, standard errors of the coefficient, t-statistics and ρ values for each explanatory variable in the equation as well as the overall R^2, adjusted R^2 and the overall F ratio for the full set of 134 cases; Table 4.24. lists the same information for the reduced set of 131 cases.

As can be seen from Table 4.23, in this full regression model for all 134 cases, only two explanatory variables, Constructive Feedback (ρ = .04) and Dysfunctional Management Practices (ρ = .01) reached a significant level. Both Team Performance Evaluation (ρ = .07) and Individual Attributes (ρ = .13) showed suggestive, but inconclusive evidence of influencing the response variable of Success.

Table 4.23 Multiple Regression: Full Model, All Cases

Explanatory Variable	β	SE	t	ρ two-tailed
Constant	-.00	.08		
A1 Organizational Infrastructure	-.04	.12	-.31	.76
A2 Teamwork Orientation	-.15	.11	-1.31	.19
B1 Performance Strategies	-.13	.12	-1.11	.27
B2 Task Requirements	.11	.13	.90	.37
B3 Individual Attributes	.17	.11	1.51	.13
C1 Performance-Based Training	.17	.16	1.06	.29
C2 On-the-Job Training	-.15	.12	-.42	.67
D1 Learner-Centered Training	.08	.14	.57	.57
D2 Constructive Feedback	.24	.12	2.06	.04*
E1 Team Performance Evaluation	-.20	.11	-1.80	.07
E2 Training Process Evaluation	.14	.12	1.15	.25
Bar1 Lack of Organizational Support	.12	.09	1.33	.19
Bar2 Insufficient Training Resources	-.13	.09	-.31	.76
Bar3 Dys. Mgmt. Practices	-.24	.09	-2.56	.01*
R^2	.24			
Adjusted R^2	.15			
Overall *F*	2.72			

n=134
ρ = <.05

In the full regression model with reduced number of cases, Success was again significantly influenced by Constructive Feedback (ρ = .02). There was also suggestive evidence that Performance-based Training affected the Success rating (ρ = .07). There was suggestive but inconclusive evidence that Success was negatively influenced by Dysfunctional Management Practices. (ρ = .11). In this analyses, the full set of explanatory variables explained 35% of the variance in the Success rating.

Table 4.24 Multiple Regression: Full Model, Reduced Set of Cases

Explanatory Variable	β	SE	t	ρ two-tailed
Constant	.09	.06	1.52	.13
A1 Organizational Infrastructure	-.00	.09	-.01	.99
A2 Teamwork Orientation	-.05	.08	-.59	.56
B1 Performance Strategies	-.13	.08	-1.52	.13
B2 Task Requirements	.11	.09	1.24	.22
B3 Individual Attributes	.06	.08	.75	.46
C1 Performance-Based Training	.22	.12	1.86	.07
C2 On-the-Job Training	-.00	.09	-.04	.97
D1 Learner-Centered Training	.03	.10	.28	.78
D2 Constructive Feedback	.20	.09	2.28	.02*
E1 Team Performance Evaluation	-.10	.08	-1.17	.24
E2 Training Process Evaluation	.11	.09	1.24	.22
Bar1 Lack of Organizational Support	.05	.07	.70	.49
Bar2 Insufficient Training Resources	-.07	.07	-1.11	.27
Bar3 Dys. Mgmt. Practices	-.11	.07	-1.61	.11
R^2	.35			
adjusted R^2	.27			
Overall *F*	4.45			

n=131
*ρ = <.05

It should be noted that in both Table 4.23 and Table 4.24 the signs of the betas of some of the critical design factor scales are not in the direction one might expect, based on the simple linear regression results. As indicated previously, the correlation matrix indicated a potential multicollinearity problem. Additional evidence of multicollinearity are coefficients with "wrong" signs (Lewis-Beck, 1980).

A review of diagnostics provided by SYSTAT indicated that multicollinearity may not have been a serious problem in either the full or reduced set.

Nevertheless, stepwise regression was used to reduce the number of explanatory variables and to select the "best" subset of variables. Because of the number of explanatory variables involved, the automatic stepwise feature of SYSTAT was used with a default alpha of .15 to enter and to remove variables rather than a manual review of all possible regressions.

Table 4.25 lists the results of the stepwise regression for all cases; Table 4.26 for the reduced set of 131 cases. As can be seen, in each analysis, three variables meet the selection criteria. The specific explanatory variables selected vary, as well as the order in which they enter the equation.

For all 134 cases, Constructive Feedback was the first variable to enter the model (ρ = .005) accounting for 11% of the variance. Dysfunctional Management Practices entered the model next (ρ = .02), accounting for an additional 4% of the variance. The last variable to enter, Individual Attributes, (ρ= .05) added a final 2% to the explanation of the variance of Success. Altogether 17% of the variance in the perceived rating of success of the teamwork training programs was explained by the combination, in order of contribution, of Constructive Feedback, Dysfunctional Management Practices and Individual Attributes.

Table 4.25 Stepwise Regression: All Cases

Explanatory Variables	β	SE	Change in R^2	t	ρ two-tailed
D2 Constructive Feedback	.255	.09	.11	2.88	.005*
Bar3 Dys. Mgmt. Practices	-.18	.08	.04	-2.26	.02*
B3 Individual Attributes	.18	.09	.02	2.00	.05*
R^2	.17				
adjusted R^2	.16				
Overall F	9.20				

(n=134)
*ρ = <.05

For the reduced set of 131 cases, Performance-Based Training (ρ = <.01) was the first variable to enter the model, accounting for 24% of the variance in the Success rating. Constructive Feedback (ρ = .01) was the second variable to enter the model accounting for an additional 4% of the variance. Dysfunctional Management Practices again entered the model (ρ = .05), accounting for an additional 2% of the variance. Altogether 30% of the variance in the perceived rating of success of the teamwork training programs was explained by the combination, in order of contribution, of Performance-Based Training, Constructive Feedback, and Dysfunctional Management Practices .

Table 4.26 Stepwise Regression: Reduced Set of Cases

Explanatory Variables	β	SE	Change in R^2	t	ρ two-tailed
C1 Performance-Based Training	.26	.07	.24	3.46	.00*
D2 Constructive Feedback	.19	.07	.04	2.55	.01*
Bar3 Dys. Mgmt. Practices	-.12	.06	.06	-2.01	.05*
R^2	.30				
adjusted R^2	.28				
Overall F	18.01				

n=131
*ρ = <.05

Hypothesis 3 addressed the potential influence of Barriers on the Critical Design Factors. To assess this relationship, the composite measures of Performance and Barriers were used, with Performance as the response variable and Barriers as the explanatory variable. Results of the simple linear regression identified no effect of Barriers on Performance (ρ = .98, R^2 = .00). Because of this relatively strong finding, no further analysis was done.

Summary of Results

Based on the regression results, there was sufficient evidence to conclude that there was a relationship between the critical design factors and the perceived levels of teamwork training success. The composite Performance score explained 12% of the variance (ρ = <.01) when all 134 cases were considered and 25% of the variance (ρ = <.01) when extreme outliers were omitted.

There was no evidence to support a relationship between the Barriers and the perceived levels of teamwork training success. The composite Barriers score explained only 1% of the variance when all 134 cases were included in the analysis (ρ = .25) and only 2% of the variance when outliers were omitted (ρ= .14). There was also no evidence to support an impact of Barriers on Performance (ρ = .98). Composite Performance and Barriers did not interact to impact Success (ρ=.08, n=134; ρ=.41, n=131).

There was evidence, when individual Critical Design Factor scales and individual Barrier scales were considered together, that three variables were related to the perceived level of teamwork training program success. When all 134 cases were included in the analysis, Constructive Feedback, Dysfunctional Management Practices and Individual Attributes, together explained 17% of the total variance in the Success rating. When three outlying cases were omitted from the analysis, Constructive Feedback and Dysfunctional Management Practices were joined by Performance-Based Training to explain 30% of the total variance in the Success rating.

Relationships Between Demographic Variables and Success

H_6 There are no relationships between demographic variables and the perceived levels of teamwork training success.

To test the hypothesis that demographic characteristics have no relationships to the perceived level of success of teamwork training programs, separate one-way analyses of variance were computed, using SYSTAT ANOVA procedures. In each case, the composite factor score for Success served as the response variable and the demographic characteristic of interest (e.g. size of the organization for which the trainer worked)

served as the explanatory variable. Where the F-ratio indicated that mean Success scores differed significantly among groups, the Tukey-Kramer protected HSD test for multiple comparisons was used to identify group mean differences. Table 4.27 summarizes the results of these tests, listing the demographic characteristics of interest, associated degrees of freedom, f-ratio, and the p value.

Table 4.27 Relationships Between Demographic Variables and Success

Demographic Variables	df	f-ratio	p
% of employees in teams	6	.86	.52
Industry	9	1.01	.43
# of employees	3	1.17	.32
Level	3	2.80	.04*
Role	5	2.22	.06
Experience	2	4.06	.02*
Education	4	.34	.85
ISD Training	4	.67	.61
Team Training	4	1.50	.21
Sex	1	1.63	.11

*p= <.05

As can be seen from Table 4.27, there was insufficient evidence to indicate that the demographic characteristics of percentage of employees in teams, the industry type, the size of the organization, the educational level of the respondent, how they acquired their knowledge and experience in ISD or team, or sex were associated with the perceived ratings of success of teamwork training programs. There was evidence that differences exist among how respondents perceived the success in terms of their level of involvement with teamwork training programs, their primary job responsibilities and their experience in HRD/Training. It should be noted, however, that the absolute mean ratings of all subgroups of the success of

their teamwork training programs was over 3.00, indicating that all groups perceived their teamwork training to be successful.

There was suggestive, but inconclusive evidence to indicate a difference in perceived ratings of success among respondents, based on their role or primary job responsibilities ($\rho = .06$, two-sided, 5 df). Among all respondents, those who identified themselves as consultants, perceived their teamwork training to be most successful, ($M = 3.61$) followed by those who identified themselves as instructional designers ($M = 3.44$); generalists and managers/directors ($M = 3.39$); and instructors ($M = 3.38$). Persons who classified themselves as "Other", which as indicated previously included both those who identified themselves as organizational development specialists as well as those who did not consider themselves to be trainers or who had training as only one of their responsibilities had the lowest mean rating ($M = 3.25$). The only significant difference among these subgroups was between the consultants and others (absolute difference = .37, $\rho = .02$).

There was slight evidence to indicate that the trainer's level of involvement with teamwork training was related to the perceived rating of success ($\rho = .04$ two-sided, 3 df). Those who design and deliver customized teamwork training rated their training the highest overall ($M = 3.51$). This mean rating differed significantly ($\rho = .02$) from those who categorize themselves as delivering or facilitating training that has been designed in-house ($M = 3.18$). There was no significant difference among those who deliver off-the-shelf training programs ($M = 3.45$) or those who report doing a combination of types of training ($M = 3.40$).

There was also slight evidence to indicate that experience has a significant association with the perceived rating of success ($\rho = .02$, two-sided, 3 df). Those with 5 – 10 years experience rated the success of teamwork training programs as less successful ($M = 3.31$) relative to those with more than 10 years experience ($M = 3.55$). The absolute difference in success ratings between these two groups was .24 ($\rho = .01$). No other significant differences between groups were identified.

CHAPTER 5

DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Discussion

Although teams are a common method of structuring work activities, there is still concern over their effectiveness and confusion over the most appropriate interventions to enhance their performance. The primary purpose of this study was to describe the current state of teamwork training in Oregon and to identify those critical training design activities, barriers and demographic variables related to the perceived success of workplace teamwork training programs.

A self-administered questionnaire, based on the literature on systems approaches to training and teams, was mailed to 531 members of two professional training associations in Oregon (The American Society for Training and Development and The National Society for Performance and Instruction). Of the 319 questionnaires returned, 134 were used for data analysis as these respondents indicated that they provided teamwork training in the workplace.

Data analysis included computing descriptive statistics on the frequency with which respondents actually performed 61 design and delivery activities, the importance they placed on these activities, the barriers they faced, and the perceived success of these programs. Factor analysis was used to cluster the items into Critical Design Factors. Correlational methods, including regression and ANOVA, were used to explore the relationships among the derived factors, barriers, demographic

variables and success. The results of these analyses were presented in Chapter 4. This chapter discusses the findings and presents conclusions, implications, and recommendations for further research.

Frequency of Performance and Importance Measures

Discussion in the following section will focus on those items ranked among the highest and lowest (i.e., top and bottom 15 items) on the Frequency of Performance and Importance measures, and on selected individual items describing core training principles. Complete descriptive statistics can be found in Appendix G for the Frequency measure and Appendix H for the Importance measure. Refer to Appendix I for ranks and correlations for both measures.

All training design involves prioritizing and trade-offs. A review of the most frequently performed activities reveals that respondents place priority on viewing teams within an organizational context, employ a participative approach to teamwork training, incorporate classical group process variables, and stress the role of the instructor and facilitator. Respondents place lesser priority on activities representing core practices of a systems view of training. The use of performance objectives, task analysis, assessment of entry behaviors, and on-going evaluation are not among the most frequently performed activities. Indeed, formative and summative evaluation activities are among the least frequently performed tasks.

Organizational context.

That respondents view teams as part of an organizational system is confirmed by the fact that 40% of the most frequently performed activities

are part of organizational analysis. This is consistent with both a systems approach to training (Goldstein, 1993, Rosenberg, 1982), and team building (Dyer, 1987; French & Bell, 1984). As indicated in the literature review, a myriad of organizational variables influence team effectiveness. Respondents most frequently consider alignment of the team's goal with organizational strategy, management's willingness to implement team's recommendations, and team resources. It should be noted that all these organizational factors, except for the team's resources, are among the top 15 ranked items on both the Frequency of Performance and the Importance measures.

Less frequently considered aspects of the organizational context are the impact of the organization's reward and information systems. Reward and information systems, although both rated over 4.00 on Importance are, nevertheless, among the lowest ranked items on both the Frequency and Importance measures.

What explains how respondents decide which organizational factors to consider? Dyer (1987) recommended prioritizing issues into three groups: issues which can be addressed by the team; issues that involve others; and issues not open to change by the team. Similarly, Cummings (1981) suggested identifying controllable variables, recognizing that accepting existing systems limits choices.

Respondents may view reward and information systems as givens, things not open to change with which the team must learn to cope. It should be noted that respondents recognize the potential impact of the reward system, listing it as one of the top-rated barriers. Although these systems influence team performance, reward systems may be considered

the province of compensation specialists within the HRD function, information systems the responsibility of MIS, and both the responsibility of management.

It is also possible that respondents have more direct experiences with both positive and negative effects of management support and goal alignment. Sixty percent of the responses to open-ended comments in the Organization category address management support and participation, followed by 19% stressing linkages with organizational strategy. Only 3% of the comments describe rewards for teamwork.

Best experiences confirm the necessity of management support at all levels, including making necessary systemic changes to support teamwork.

> Best experiences all relate to top management's commitment to understand and fully support systemic changes needed to effectively engage teams in real teamwork.

> A clear commitment from management...The ability of the organization, to change the way they do or accomplish work.

While 19 of the comments coded as Management Support describe Best experiences, 30 comments describe Worst experiences. Worst experiences portray managers who state support for teams and training but do not follow through with resources or participation or who actively resist efforts.

> Management commitment is critical. In high production periods, training has suffered. This sends a message to the operators that training is not that important. Follow-up sessions are also critical.

> Did teamwork training for sales staff. The 2 two hour sessions included how groups work (Tuckman), effective meetings, individual styles, plus an introduction to CQI. All was well received by group but when they left the manager said, This is all great but the bottom line is we have to move x thousand sales this year so we'll do whatever it takes to do that. Poof.

At times, written comments reveal a painful learning experience for the trainer.

> Department director reduced (training) from one day to 1/2 day. Top management didn't legitimize team's feelings of being ignored until it was revealed team had not been told of a recent reorganization. After scheduling follow-up to discuss reorganization, it was canceled three times and never held. When I proposed two high level staff who could help improve communication with the director, he fired both of them.

Respondents also report more negative than positive experiences with the concept of goal alignment. One respondent states tersely under Worst experience: "The team goals were not tied to organizational goals."

Participative approach.

Among the highest rated of all 61 items on both the Frequency and Importance measure are several exemplifying a participative approach to training: encouraging all team members to attend training, and enlisting team members help in analyzing the team situation.

The items are consistent with core beliefs of adult education as proposed by Knowles (1984) and the classical human relations underpinnings of team building (Dyer, 1987, French & Bell, 1984), which also emphasizes including team members in the diagnosis of the problem situation. Encouraging all team members to participate in training is also a

recommendation of the more behaviorally-focused team training literature (Dyer, 1984; Swezey & Salas, 1992).

How does one go about encouraging all to participate and what conditions support total participation? According to responses to open-ended questions, important considerations are "the readiness of the team/teachable moment," and voluntary recognition and acceptance of the need for teamwork training, as illustrated in the following Best experiences.

> The members of the group wanted to become a team and allocated enough time weekly to work through the process. They set and accomplished their goals.
>
> Working with all of the people on a team, all of them interested in working with improving their teamwork and related skills...organizational support for them to do this and to continue to devote some time to it over the long term

On the other hand, team members mandated to attend training led to some of the worst reported experiences.

> Employees who thought they were mandated (and they were) to be at training and didn't want to be there
>
> Team members were arbitrarily appointed by school superintendents and required to attend the training...
>
> Employees were mandated to attend. Supervisor refused to participate as part of the team. Session became conflict laden.

Readiness to learn is also influenced by overall organizational climate for teamwork. Again, the climate either helps or hinders, as illustrated by the following Best and Worst experiences.

> When I worked at another company, everyone received teamwork training during orientation. This helped set the stage for working together.
>
> Working with individuals who are not currently part of a team or group and required to attend training by organization (my client) in case they should ever join a team. Training scheduled by organization at the end of the shift in a manufacturing, low skill labor environment. Some participants didn't feel teamwork or interpersonal communication skills were necessary or important to them...

Teamwork training can, in other words, become part of corporate culture, part of the socialization process, or it can be seen as irrelevant and even disruptive to the "real" work that needs to be done.

The concepts of total team participation, voluntary attendance, and training at the teachable moment may be difficult to realize in practice. How does one know if and when the team has reached consensus on the need for training? What happens if some members of the work group slated to become a team do not buy in to the process? What if training or consultation are not available at the appropriate time? An internal trainer, especially one who has defined her role as a consultant to team leaders or managers, may be able enough to offer training, consultation, or facilitation just-in-time, especially if she has developed a cadre of in-house facilitators (team leaders and managers) to coach and support new teams. But what if an organization in crisis decides to make wide-scale changes to survive? It may not always be possible to wait for the teachable moment. Indeed, part of the training may be designed to help employees understand the need for change.

The item, "Relate training activities to past experiences of team members," which might be considered part of a participative approach as

well as a core training principle, has a rank of 11 on the Frequency measure but drops to a rank of 42 on the Importance measure. Why might this be so? If it is true, as asserted in Chapter 2 that many teams do not perform to their potential (Lawler, 1992; Leimbach, 1992; Senge, 1990; Steiner, 1972), then trainers may consider past experiences as hindrances rather than helps to training efforts and may chose to focus on current opportunities rather than past mistakes.

Core team process issues.

Respondents report spending the most time on basic group process issues: clarifying individual responsibilities, the team's goals, and identifying decision-making processes. On the Importance measure, clarifying team goals fell from a rank of 9 to a rank of 19. On the other hand, another specific process issue, identifying the team's conflict management strategies, moved from a rank of 24 on the Frequency of Performance measure to a rank of 8 on Importance. Two other items, related to specific communication skills (learning to give and accept constructive feedback) join the top ranked items on the Importance measure. It should be noted that although the item on identifying conflict management strategies moved into the top ranked items on Importance, actively practicing conflict management is still, at a rank of 48, rated low relative to other items.

Apparently the respondents in this study reflect observations of other researchers—that broader, multi-dimensional interventions are being used (Tannenbaum et al., 1992). These items represent a variety of traditional team building issues and approaches (Beer, 1976; Tannenbaum, et al., 1992). Clarifying responsibilities is a core focus of role-clarification

approaches; decision-making is linked to problem-solving approaches; goal clarification is cornerstone of goal-setting approaches; and constructive feedback is part of interpersonal approaches.

Role of instructor.

Only two items on the entire questionnaire directly addressed the role of the instructor/facilitator, yet both are among the top ranked items on the Frequency Measure. According to respondents, the instructor and facilitator is responsible for modeling effective communication behavior and creating a social environment conducive for learning. The item referring to the social environment is not among the top ranked items on the Importance measure, dropping in rank from 7 to 23.

An item pertaining to the nature of the training and learning environment is among those items ranked most important. The item, "Provide situations for teams to learn from mistakes in a non-threatening environment" may be perceived as real-world performance-based. It may also be interpreted to include interactions with other team members, interactions more important than that between the instructor and team members in the long run.

Again, responses to open-ended questions help to clarify the rankings. Fifteen percent of the comments in the category of Training address the role or influence of the instructor/facilitator. Respondents judge teamwork trainers and facilitators on two criteria: the extent to which they model good teamwork skills and the extent to which they follow good adult learning principles.

Best experiences are characterized by facilitators who relate openly and honestly to participants, engaging them in the process.

> Training led by facilitator who made each team member feel worthwhile and important, no matter what the results ended up being.
>
> The instructor's ability to take into account individual differences/similarities and how to incorporate them into the team concept.

Worst experiences are led by facilitators who violate the standards of respect and acceptance advocated by Knowles (1984) or who can not adapt to the needs of the team or the organization.

> Poor facilitator who didn't encourage open communication. There was distrust, confusion, and resentment throughout most projects.
>
> Team building in-service. Facilitator dominated the interaction. Process deteriorated into gripe session.
>
> Two hour training on rewarding the positive contributions of employees. It was bad because facilitator never established credibility with audience and the facilitator's ideas and approaches were not practical.

It is, of course, difficult to assess if the root causes of these experiences were the skills of the facilitator or fundamental problems with the design and objectives of the training sessions.

Core training principles.

Items representing core systems training activities—use of performance objectives, task analysis, assessment of entry behaviors, and on-going evaluation—are neither among the most frequently performed nor among those ranked as the most important activities.

Performance-based objectives.

This study finds that writing performance-based instructional objectives is not a high priority for respondents. Fifty-seven percent of respondents report that they perform the activity regularly, and almost 80% rate it as "Important" or "Very Important." Nevertheless, the activity is ranked as 46 on Frequency and 54 on the Importance measures. As reported in Chapter 2, developing objectives or goals is recommended for both training (Goldstein, 1993), and for team building (Dyer, 1987, Woodcock, 1975).

The low priority by respondents in this study may be related to controversy over the appropriateness of performance-based objectives for complex, problem-solving tasks (Seels & Glasgow, 1990) or to difficulty in preparing performance-based objectives for complex tasks (Campbell, 1988). It may also reflect a desire to develop objectives collaboratively, with team members, rather than to impose objectives on the team.

Task analysis.

As discussed in the literature review, the task to be accomplished is central to a team's life, to its processes, interactions, and even to its values (Hackman, 1990). The difficulty, complexity, and nature of interdependence associated with the task all affect team processes, required skills, and potential outcomes. A systems approach to training includes task, knowledge and ability analysis (Goldstein, 1993) as core to identifying content and outcomes of a training programs.

Nevertheless, an item relating to the impact of the team's task on interaction is ranked 43 on Frequency and 52 on the Importance measures. Items relating to identifying the teams' problem-solving strategies and

decision-making processes, however, are both ranked among the top 20 items on both Frequency and Importance measures.

It appears that respondents may view the team's task, whether producing widgets or preparing market analyses, as a given, requiring technical knowledges and skills that must be acquired and practiced in other settings. Problem-solving and decision making, on the other hand, are generic tasks and skills, applicable to a broad variety of operational tasks and thus, the most essential for inclusion in teamwork training. These generic skills may be considered most appropriate for training, given the potential for rapid changes in task, technology, job, and team assignments.

It is also possible that the lower rankings for task analysis reflect methodological and practical problems. The majority of task analysis procedures focus on individual, not team tasks and are not appropriate for complex, interdependent, or emergent tasks (cf. Dick & Carey, 1985). Similarly, when implementing an organization-wide training program for teams, it is not practical to analyze the particular work tasks of every team to be trained. Instead, the focus will be on generic tasks, those applicable across teams and technical tasks.

This interpretation leaves unanswered questions. An item referring to creating customized training activities based on real-life team problems was ranked 16 on Frequency and 18 on Importance. It is unclear how respondents interpreted the phrases "customized" and "real-life team problems." The intent of the questions was to identify the extent to which team members worked on work-based simulations or actual team tasks (i.e. production or market analyses problems) rather than generic training

activities. A potential problem with generic teamwork training programs is described succinctly by one respondent

> Current situation is the worst. Predesigned training; had no input to it—all 4000 employees take the same stuff. Training has no intake or output from participants and certainly any provided would not be used to amend program for each group's special needs. Everyone HAS to take it when told to.

Further research is necessary to determine more clearly the task-related content of teamwork training programs and the extent to which they incorporate real team problems and tasks.

Assess entry-level skills.

The item, "Assess the existing teamwork skills of individual team members," is ranked 50 on both Frequency and Importance measures. Pre-assessment of learners is recommended to make sure employees need training, to identify what training is needed, and to allow for individual differences (Campbell, 1988; Gagne, et. al 1992, Goldstein, 1993). It is possible, as discussed in the previous section on Task Analysis, that respondents define essential teamwork skills as problem-solving, decision-making and conflict management. The more general item may be redundant or ambiguous.

There is another possibility, linked to the low rankings given to Task analysis. If respondents do not do targeted task analysis of teamwork skills, then they have little basis upon which to assess entry behaviors. And, just as with task analysis, methodological problems might play a part. Pre-assessment methods may be both difficult to develop and to implement. Responses to open-ended questions indicate that assessment instruments are used; however, the most commonly cited are

commercially available style instruments, as described in the Best experiences described below.

> Communication training incorporating the Kiersey Temperament Sorter. Team members learned more about their own styles and those of their colleagues. I felt it promoted greater understanding overall—greater support of diversity.
>
> Meyers-Briggs training focused on how our staff communicates. Excellent for helping to appreciate our differences rather than griping about them.

The use of style instruments as opposed to more specific team task and skill assessment instruments may also be evidence of an emphasis on intrapersonal and social processes.

On-going evaluation.

The last 10 items in the section of the questionnaire all relate to evaluation, a core tenet of a systems approach to training. Differences in relative item rankings between the Frequency and Importance measure indicate that respondents recognize the importance of evaluation, but do not include it among their priorities in practice.

One item, referring to the use of trainee feedback to modify training programs, was among the top 15 ranked items on both measures. Providing opportunities for team members to rate their satisfaction with team work training activities was ranked 14 among Frequency of Performance performed activities, but dropped in rank to 26 on Importance. One evaluation item, evaluating improved team performance, moved from a rank of 56 on Frequency to 15 on Importance.

Findings on evaluation are consistent with previous research;

namely, using Kirkpatrick's framework, satisfaction with training is the most frequent type of evaluation performed (Kirkpatrick 1978; Goldstein, 1993; Saari, et.al., 1988; "Industry Report," 1994). Findings from this study are also consistent with an Oregon study which found that most companies did not measure or assess the results of their training activities (Oregon Works, 1993).

This study goes beyond the four levels of Kirkpatrick's framework, and also looks at evaluation activities congruent with a systems approach to training: pilot testing, linking evaluation measures to objectives, and using trainee feedback to modify training programs. The study also includes an item unique to teams: ability to work together over the long-term. As indicated previously, the item on trainee feedback is top ranked on both measures. Obtaining this type of feedback can be done relatively easily, through informal chats with team members or as part of the general satisfaction questionnaire.

The other evaluation items require greater investment of time and are more difficult to implement. Pilot testing of activities is designed to improve the training content and process before full-scale implementation. Pilot testing is ranked as 58 on Frequency and 55 on Importance. The low relative ranking on Frequency may reflect lack of time or resources. Coupled with the low rating on Importance, however, it may indicate that pilot testing is not deemed necessary or appropriate for teamwork training activities. It may be that pilot testing is associated with standardized training packages and that teamwork training is viewed as more customized—in an action research mode. Even traditional team building experts, however, suggest testing activities in small groups or

with volunteers before incorporating them into one's repertoire (Woodcock, 1975).

Linking evaluation measures to performance objectives presupposes that performance objectives are developed. This item, although ranked 40 on Frequency, moves up to a rank of 31 on Importance. It may be that respondents recognize that one must have some criteria against which to evaluate performance.

The final item, which referred to one of the team effectiveness levels included in recent group models (Hackman, 1983; Tannenbaum et. al., 1992), the ability of the team to work together over the long run, may create several difficulties for trainers. First, there are methodological problems. The trainer would need to develop measures to assess this phenomenon. Secondly, the team would have to be followed over a period of time. Follow-up requires access to the team and support from management and the team. Respondents report that lack of follow-up is a barrier to the design and development of teamwork training. It is unlikely, given the low priorities to more direct forms of evaluation, that this type of long-term evaluation could be sold to most organizations.

Correlations between Perceived Importance and Frequency of Performance

Research Question 4 asked if there was any relationship between perceived importance and frequency. One might assume a positive linear relationship, believing that if trainers perceived an activity to be important, that they would tend to perform it more frequently than those they assessed as less important. However, the study also recognizes that perceptions and actions are not always congruent and that organizational

barriers might constrain performance. Trainers may not always be able to do what they believe it is important to do.

High correlations can perhaps be interpreted as some evidence of correspondence between perceptions and actions. That is, if respondents perceive an activity to be important, they will perform it more frequently and if they don't think it is important, they will do it less frequently. They may also place similar priorities for actions on items they think are neither important nor unimportant. There is, of course, the assumption that they have the freedom and choice to follow through from perception to action.

Low correlations between ratings on Frequency of Performance and Importance may represent situations when respondents think it is important to do an activity, but for some reason they do not do it frequently, or, conversely, they perform an activity even though they don't think it is important. Possible explanation for the two situations are quite different.

In the first case, the fact they don't do what they believe is important to do may be influenced by organizational or personal barriers. All of the Barrier items could conceivably influence design and development activities. Other variables, not included in the Barrier items but alluded to in the previous section, may also play a role. Trainers may lack expertise in certain areas. There may be methodological difficulties such as the lack of readily available, accessible information on analyzing team tasks.

Secondly, respondents report doing what they didn't think is important. Different explanations may be at work here. Respondents may be meeting client or team member expectations; expectations with which they do not agree. Certain training activities are easier to prepare and

deliver or facilitate than others. Identifying a team's conflict management strategies, for example, although rated among the most important activities, is not rated among the most frequently performed. Dysfunctional conflict management strategies can certainly derail a team. It is, however, one thing to identify strategies and another to deal with them. That is much harder to do, as evidenced by a respondent who wrote, "Discussed teams and conflict; got them out on the table, but didn't settle. In fact, got people angrier."

Activities may also be performed even if they are not perceived as important because they are easy to deliver or facilitate, because there is the sense they will do no harm, or because the person is delivering or facilitating a program designed by someone else.

Barriers

Respondents report that organizational barriers constrain the effectiveness of their teamwork training programs. Conditions typically associated with training, namely lack of development and delivery time, training staff and budgetary resources (Lange & Grovdahl, 1989; Wedman & Tessmer, 1993) are not perceived as serious barriers as those relating to overall organizational factors, specifically management perceptions or actions relating to the implementation and practice of teamwork within the organization.

The results are consistent with previous findings, reported in Chapter 2, that managerial support and leadership are necessary preconditions for effective training (Goldstein, 1993) and teamwork (Lawler, 1986, Leimbach, 1993; Pearce & Ravlin, 1987, Hackman, 1990). Management support is a relatively nebulous concept, however, and can be

realized in a number of different ways. In this study, the critical aspects of management support are related to implementation: how generalized statements of support are translated into practice.

Respondents distinguish between time to develop and deliver training and the time within which results from training are expected to occur. The highest rated barrier, that management expects a quick fix, may reflect a penchant for short-term, immediate results as well as a belief that training should be a panacea, fixing the problem without other systemic organizational changes. This expectation of a quick fix may be related to the belief that people learn teamwork simply by working together (Cannon-Bowers, et al., 1991) or to a misunderstanding of the skills and attitudes required for effective teamwork. Managers could both overestimate the existing teamwork skills of employees and underestimate the time and conditions necessary to acquire and practice teamwork skills. Desires for a quick fix may reflect unrealistic expectations for teamwork training. As was noted in Chapter 2, realistic expectations are advanced as a necessary condition for effective team building (Liebowitz & deMeuse, 1982). This possibility of unrealistic expectations is supported by the other conditions identified as organizational barriers to effective teamwork training.

Training of any sort, whether technical or interpersonal, requires a positive climate for transfer. Positive transfer climate has been described as those conditions which provide opportunities and rewards for trainees to use what they've learned (Baldwin & Ford, 1986; Goldstein, 1993). In other words, training, in and of itself, will not ensure use and maintenance of skills and attitudes. The results of this study provide additional support for the importance of a positive transfer climate. Specifically, teamwork skills

must be reinforced on the job by managers and supervisors who model and reward desired teamwork behaviors. In order to model teamwork behaviors, managers and supervisors must themselves possess the necessary teamwork skills and attitudes, must recognize the importance of these behaviors, and must be willing to model teamwork.

It may, however, be difficult for mangers and supervisors to model appropriate behaviors. Implicit in the concept of modeling is a willingness by managers and supervisors to accept changes in power relationships. Over 84% of respondents note that this was resisted by mangers and supervisors. The importance of this barrier is consistent with the findings of Leimbach (1993), that the inability of individuals to make the necessary personal mind shifts to address issues of position, power and past practices make it difficult for teams to be effective.

Over 83% of respondents report that reward systems do not support teamwork. This finding is consistent with that of Leimbach (1993) who found that existing reward systems focused on individual rather than team performance, providing little incentive for team work. As indicated in Chapter 2, reward systems are one of the most commonly cited organizational variables tied to team effectiveness (Gladstein, 1984; Goodman et. al, 1987; Lawler, 1986; Shea & Guzzo, 1987).

The last of the organizational conditions considered a barrier to effective team performance by over 76% of survey respondents is lack of follow-up on the job. Lack of follow-up is closely related to previously discussed barriers. Managers who expect quick-fixes may not recognize or support the need for follow-up on the job and, thus, fail to provide team members with appropriate performance feedback. Trainers may not be

provided access or time to work with teams on skill maintenance. Finally, managers and supervisors who do not practice teamwork themselves lose the opportunity for a direct and powerful form of follow-up: clear models of effective performance.

Success

Respondents perceive their teamwork training programs to be successful, with all nine items rated over 3.0 on a four-point scale. Patterns emerge by comparing the relative mean ratings of individual items to Kirkpatrick's (1976) evaluation framework, with the highest mean ratings being assigned to items at the reaction level, lower mean ratings assigned to items at the performance, and still lower mean ratings to items at the results level.

Items that can be assessed through standard end-of-course evaluation forms, a practice that 76% of respondents report performing nearly always or always, receive the highest mean ratings. The items addressing enjoyment and usefulness are what Kirkpatrick (1976) termed reaction measures, and, in study after study, are the most frequent training evaluation data collected. Unfortunately, there is little empirical evidence that perceived enjoyment correlates with learning, performance or results (Alliger & Janak, 1989; Dixon, 1990). Nevertheless, respondents appear confident that team members react positively to the teamwork training experiences.

Items relating to changes in team performance received lower ratings than more readily assessable reactions. Even though fewer than 50% of respondents report regularly assessing changes in team behavior, over 88% percent indicate that team members work together and

communicate better as a result of teamwork training. It is possible that these ratings are based on informal observations of changes in team performance over the duration of the training experience, not necessarily on enhanced performance on the job. In addition, anecdotal reports from team members and managers may be used as evidence of improved team performance even though formal, structured assessments of behavior are not conducted.

Teams' goal achievements and improvements in contributions to organizational productivity, both measures linked to results, level 4 of Kirkpatrick's framework (1976), are rated lower than either immediate reactions or observable behaviors. This is to be expected, since more in-depth, performance data is required as evidence to support the linkages between training and productivity. As indicated in both training and team building literature, both time and complex, confounding variables make it difficult to establish direct causal linkages between the effect of teamwork training on teamwork performance and thus on organizational productivity (Goldstein, 1993).

It should be noted that the number of persons responding, <u>don't know</u> increased with the level of evaluation. That is, few respondents chose this response category for the item addressing reaction measures. Items with the largest numbers of <u>don't know</u> responses require more in-depth, on-the-job performance evaluation measures. Such <u>don't know</u> responses may result from lack of management support for long-term evaluation, lack of access to information, lack of trainer expertise, or fear of the evaluation results (Grove & Ostroff, 1990).

The lowest ratings of all the success items relate to trainer and manager's satisfaction with teamwork training and team member's satisfaction with their performance. If teams enjoy teamwork training and find it useful, communicate and work better together, achieve performance goals, and contribute to organizational productivity, why aren't team members, managers and respondents more satisfied? Might these lower ratings indicate some reservations on the part of the trainers on the actual effectiveness of their programs? Does it reflect ever changing and ever increasing standards, part of a continual striving for excellence? Answers to these questions deserve further study.

The most important issue is the extent to which questionnaire responses accurately reflect what trainers actually do and the actual success of teamwork training programs. These ratings must be viewed in light of some of the well-known limitations of self-report data. The overall high self-report ratings of teamwork training practices and teamwork training success could be a result of an acquiescent response set, where all items in a section are rated the same (Rosnow & Rosenthal, 1992); or social desirability (Babbie, 1992) where trainers marked what they thought was the most appropriate to support their sense of being an effective trainer. Since the decision has been made to move to team-based structures and to provide teamwork training, respondents may feel a sense of commitment to their training programs, even in the face of no evidence or even evidence to the contrary.

It is also possible that the four-point scale for the Success items did not allow for sufficient discrimination. Unfortunately, no objective performance data was collected to confirm ratings nor was data collected

from other actors, either team members or managers, in the organizational drama being played out.

Relationships Between Critical Design Factors and Success

As illustrated in Table 4.30, all Critical Design Factors correlate positively with perceptions of teamwork training success. The best predictors of teamwork success ratings varied depending upon the sample of respondents, the entire sample or a reduced set.

When the entire sample is analyzed, the best predictors are Constructive Feedback, Individual Attributes and Dysfunctional Management Practices, accounting for 17% of the variance in the Success rating. When three outlying cases are omitted, Individual Attributes is replaced by Performance-based Training, with Constructive Feedback and Dysfunctional Management Practices remaining in the equation. These three variables account for 30% percent of the variance in the Success rating.

The zero-order correlation between Constructive Feedback and the Success rating is $r = .34$, the highest of all Critical Design Factors. This factor includes items pertaining to trainer feedback to individual team members and to the team as a whole. Trainer feedback tends to be immediate and focused on behaviors occurring during the training experience. Numerous research studies have demonstrated the positive effect of feedback on learning, leading to its inclusion as a general training principle (Campbell, 1988; Goldstein, 1993).

The Constructive Feedback factor extends the concept with the addition of items relating to team members learning to give and accept constructive feedback and to learn from mistakes in a non-threatening

environment. These skills and attitudes provide the basis for continuous team learning on the job. Giving feedback requires that a team member understands the task and standards of performance, can identify when standards are not being met, and can accurately point out errors or make specific performance-related suggestions in a non-threatening, credible manner. Accepting feedback entails a sense of personal responsibility and non-defensiveness, a willingness to learn from mistakes, and to acknowledge the feedback. Previous studies support the importance of this type of feedback from peers. Members of Navy teams rated more effective were better able to identify and correct errors and to provide positive reinforcement in a non-threatening manner (Oser, et al., 1989).

The Critical Design Factor, Performance-Based Training, correlates at a zero-order level of $r = .32$. This set of items integrates participative approaches, systems views, and traditional team process concepts. The factor encompasses training practices that involve all team members in training based on performance-based objectives. During the training, team members interact with each other to clarify responsibilities and goals and work through conflict as they work on real world problems. The instructor/facilitator strengthens and confirms the experience by modeling effective communication behaviors.

The Critical Design Factor, Individual Attributes, correlates at a zero-order level of $r = .30$ with Success. Whereas Performance-Based Training focuses on training and learning activities, this factor focuses on the team members themselves: the skills required by the team tasks, the team members' skill levels, their commitment to and attitudes toward their team, and their expectations for training.

At this point, there is insufficient data to explain the difference in results between the full and reduced set. The three respondents identified as outlying cases may represent a group of trainers in the workplace who, for some reason, are not included in larger numbers in the sample. It is also possible that they are an anomaly and are not representative of the larger number of workplace trainers providing teamwork training.

Dysfunctional Management Practices correlates negatively with the Success rating ($r = -.20$). This factor enters into the multiple regression equation with both the entire sample and the reduced sample. It confirms numerous other studies which indicate that training by itself is insufficient; management must support training with a positive transfer climate (Baldwin & Ford, 1986; Goldstein, 1993).

The factor includes two items relating to the modeling of teamwork and meaning of teamwork. These items are related and confounded. First , how managers define teamwork will influence what they pay attention to, reward and support. If different managers define teamwork differently, they will send different, possibly conflicting messages. While there need to be opportunities for flexibility and individuality, there is also a need for some level of common understanding or shared vision within the organization (Senge, 1990). Respondents indicate that lack of shared vision hinders their teamwork training programs.

Managers also need to walk the talk. It is not enough to plaster slogans around, send employees off to training, and exhort employees to be team players. Managers must model the desired behaviors—they must be team players. Becoming a team player may be difficult, especially if managers continue to be rewarded for competitive, individualistic

behavior (Katzenbach & Smith, 1993), if managers don't know what team work means, and if they are not willing to address changes in power relationships (Leimbach, 1993).

Relationships Between Demographic Variables and Success

Only two demographic variables, level of involvement with teamwork training and years of experience in HRD, have a slight relationship to perceived success. As indicated in Chapter 2, little empirical evidence exists about the relationship of trainer-related variables and workplace training.

The lower ratings by those who deliver teamwork training programs designed by someone else in-house may be attributed to the nature of the program itself, to the preparation of the trainer, or to differing perspectives between the original designer and the respondent. The fact that respondents report delivering a program designed by someone else implies a somewhat standardized package. The first questions relate to the quality of this package. As outlined in the literature review, teamwork training is a complex issue, incorporating concepts from a variety of disciplines. We have no way of knowing what type of a design process was used, what underlying conceptual frameworks of organizations, teams and learning were employed, or how the design and programs have been evaluated. In other words, these low ratings may indeed reflect a poorer quality product.

Since this is a probably a standardized product, it may not be adaptable to the needs of the diverse teams being trained. Do these standardized packages, for example, use real-world experiences and problems of the team being trained, or do they rely on the types of standardized activities which can be purchased from training companies or

found in the many books of team building activities, activities which may not represent the real problems that teams face (Hare, 1992)? It may be that this finding provides additional support for the concept that one size does not fit all in teamwork training (Hackman & Morris, 1975).

Lower ratings may reflect inadequate trainer preparation. Advocates of a systems approach recommend that instructor guides be developed as part of any team training program to ensure that instructors and facilitators understand the purpose and concept of the overall program as well as specific activities (Davis, et al, 1986). Preparation, or training trainers to train, for these respondents may have spanned the continuum, from no training with incomplete or non-existent documentation to intensive mentoring and on-the-job experience, supported with comprehensive instructional packages and continuing coaching. It is, however, likely that respondents delivering a program designed by someone else are simply not as familiar with the content or the process as a trainer who designs and delivers a program they have designed.

Lower ratings may also reflect differing perspectives on the nature of teams and teamwork training. As summarized in the literature review, there are many different views on how to create and facilitate effective learning experiences for adults in general and teams in particular. Preferences for these approaches are dependent upon a myriad of variables, including underlying values, personal style, experience, education and so on. While one person may favor a task-centered approach, another may favor an interpersonal approach. A task-oriented person may not feel as comfortable, as skilled, or as successful in facilitating programs geared toward interpersonal exploration and vice versa. Also at question is the

degree to which respondents are able to adapt the program to their delivery style and skills, and to the perceived needs of particular teams.

It is also possible that persons who deliver programs designed by others have both less experience in HRD/Training and with teams than those who design and deliver customized training programs. Further data analysis could be done to explore this possibility, at least in reference to experience in the HRD/Training field.

The number of years a person has worked in the HRD/Training field has an effect of the perceived success of teamwork training, with those with over 10 years experience rating their programs as more successful than those with five to ten years experience. This finding may be expected, if we believe that additional years of experience lead to greater technical knowledge about organizations, group dynamics, the change process, and learning as well as increased skill in diagnosis, design, facilitation, and personal maturity.

Open-ended responses support the notion that trainers face a difficult learning process in their ability to work with teams. In each case, respondents wrote about it in terms of a Worst experience.

> Team building with 40 engineers who didn't want to be there. Worst because I was too inexperienced and tried to approach the group through my own culture rather than theirs.

> I was new to the company, conducting training to people who had been together for years and I didn't have a good command of industry-type examples, not to mention very little name recognition—identification.

It should be noted that respondents with less than five years experience do not differ significantly in their ratings of success from those with over 10 years experience. A number of possibilities may explain this unexpected result. The ratings may, perhaps, represent the confidence of youth and may be an overestimation of the success of their programs. It is also possible that as relative newcomers they work in organizations alongside more experienced trainers and are experiencing successful results. As relative newcomers, they may also be working with less complex and less difficult problems; that is, working with one or two problem-solving teams rather than trying to coordinate the implementation of an organization-wide continuous improvement effort. As newcomers to the field, they may not have worked with teams over a long duration and may not, for example, have had to deal with the declining performance of mature teams.

Conclusions

The following conclusions can be drawn from the findings and discussion presented previously.

- **The activities listed in the questionnaire are important for the design, development and delivery of effective workplace teamwork training.**

The 61 questionnaire items describing teamwork training activities were generated through a review of the literature on training, the adult learner, teams, team building and team training, and validated by a Delphi panel. The fact that respondents rated the vast majority (95%) of the items as <u>important</u> or <u>very important</u> provides further validation of the importance of these activities to effective teamwork training.

As indicated in Chapter 2, both team building and team training methodologies encourage a systems view, yet differ in the variables included in the system, the nature of the variables, the emphasis given to them, and the nature of interventions. The intent in this study was to develop an integrated list of activities, based on the perception that workplace practitioners do not make the clear distinctions between team building and team training as do academics, but borrow concepts and techniques from myriad sources. The fact that the vast majority of items were rated as important supports an integrated view of teamwork training. Furthermore, given the high rate of agreement on their importance, these items may be useful for trainers to consider when designing, revising or reviewing teamwork training programs.

- **The ADDIE model provides a useful framework for exploring teamwork training needs.**

The ratings on the Importance scale also provide support for the usefulness of the ADDIE model. The ADDIE model served as a framework for integrating concepts from the literature and for generating items for the questionnaire. As indicated in chapter 2, training systems models have been criticized as being too abstract, rigid and inflexible for contemporary workplace problems and inappropriate for ill-structured problems. In this study, the ADDIE model was applied as an organizing, question-raising, creative design heuristic rather than as a prescriptive set of rules based on narrow behavioral, cognitive, or experiential definitions of learning and training. The model was applied systemically and systematically to a messy, complex, ill-structured problem, yet resulted in a comprehensive listing of activities with which trainers agreed.

• **Respondents view teamwork training in context.**

Practitioners have been criticized for viewing teams as closed systems, stressing interpersonal relationships and ignoring the potential impact of organizational factors. They have also been criticized for viewing training as a closed system, as evidenced by providing catalogs of conventional course offerings rather than linking training to organizational strategy and individual needs. In this study, activities relating to front-end analysis, especially organizational analysis, were among the most frequently performed activities, indicating that respondents do recognize that teams and training systems are embedded within larger systems which can either hinder or support both activities and performance.

Respondents may have been convinced of the importance of considering teams in context by experts or through experience, or the results could represent response bias. The literature on systems approaches to training has stressed the importance of front-end analysis, asserting that it lays the groundwork for everything that follows. Similarly, team building theorists advise careful diagnosis of the situation before action planning. The message appears to have been heard.

Respondents may also have learned through experience to view teams in context. If it is true, as the ratings and open-ended responses suggest, that respondents have experienced management perceptions and actions as barriers to the teamwork training effectiveness, then they may be more likely to consider the impact of these variables in subsequent efforts.

• Although respondents espouse an integrated view of teamwork training, in practice, they emphasize activities associated with traditional team building approaches.

As noted in the discussion, the highest rated activities in terms of frequency of on-the-job performance relate to organizational analysis, participative approaches, and classical group process variables. Respondents place lesser priority on core systems training principles such as preparing performance objectives, analyzing tasks and evaluating training.

Training involves trade-offs and these respondents appear to make trade-offs in the area of a systems training approach. As indicated in the discussion, these tradeoffs may be made because they do not subscribe to a systems approach to training in general, because they do not consider these particular activities appropriate for teamwork, because methodological limitations make application difficult, or because organizational barriers constrain their performance.

On a philosophical level, these findings may also reflect tensions between different world views, which may be translated into task-based and relationship-based views of teams, and team training and team building approaches. These particular activities, especially developing performance objectives, tend to be linked with a behaviorist view of training, and may be interpreted as imposing task-oriented, pre-determined objectives onto passive learners as opposed to the more humanistic view which encourages active participation and self-generated goals.

In a traditional ISD model, it is true that objectives are often developed by the instructional developer, based on data from managers

and workers, prior to implementing any intervention. Performance objectives and training content are developed based on discrepancies between actual and desired performance. Performance focuses on task accomplishment. The resulting carefully designed product or intervention may strive for congruency, consistency and efficiency, but leave little room for flexibility or creativity on the part of the user. Evaluation activities are also done primarily by someone external to the team.

In traditional team building, on the other hand, goals, agendas or objectives are often negotiated with managers, team leaders, and team members, based on joint and continuing analysis of what the team needs to do to become effective. Negotiation and evaluation may take place both before and during the intervention. Performance includes both task performance and relationship issues. But underlying this supposedly collaborative, team-centered effort are clear assumptions and prescriptions of what effective teams look like and how they should perform. These beliefs and assumptions form the basis for the many inventories, checklists and activities found in team building texts. Although the team supposedly freely identifies its needs, sets its own goals and action plans, and evaluates its own progress, the facilitator carefully structures activities so the team will identify needs and exhibit behaviors congruent to these predetermined characteristics of effective teams.

It appears as if both approaches to teamwork training have prescriptive elements. What is needed is common ground, an integration of the best practices of both approaches. Soft systems approaches, as described in chapter 2, and incorporated into newer models of systems training, may offer promise in reaching common ground. Soft

systems analysis is based on the recognition that there may be multiple perspectives on the nature of a complex situation and on the desired outcome. It provides methodologies to involve all parties to discuss and debate alternatives to agree on the desired outcomes and the ways to reach them. Carrying out soft systems analysis, indeed, requires collaborative, committed effort.

Implications

Findings from this study support the view that effective teamwork training practices incorporate a systems view, focus on performance, design quality in, and encourage continuous learning. Specific implications of these findings follow.

- **Incorporate a systems view of teamwork training**

All critical design factors correlated significantly with one another. On the one hand, the correlations could indicate limitations in operationalizing concepts, developing items, or deriving factors. They could also indicate that these activities and factors must truly be considered holistically and systemically. The relationships among factors are complex and, perhaps, inextricably intertwined. This is consistent with systems thinking which recognizes that while cognitive limitations lead one to view only one part of the system at a time, one must constantly be aware of the other parts of the system and their interrelationships and interdependencies.

Viewing teamwork training systemically implies challenges for trainers. Trainers may first have to examine their own assumptions, beliefs, and actions. Are they focusing on teams in isolation, defining

teamwork as a pre-determined and predictable set of relationship skills, or are they considering the big picture? Are they using a team concept to analyze and develop teamwork training?

Trainers must identify those elements of the systems which will impact the design and implementation process and then work with the team to identify its system elements. While the type of system elements may be similar across organizations or teams, the nature of the elements and the pattern of the interrelationships will most likely differ. Trainers and teams must identify those patterns and decide what is important to consider and where the team has leverage. In organizations moving to team-based structures, where many teams need training, the trainer must work creatively within the system to maintain a balance between common understanding and adaptability and flexibility for individual teams.

Trainers may need to take risks and challenge management if the situation analysis indicates that training is not the most appropriate solution or if organizational changes need to be made to support teamwork. For example, teams may have the skills and attitudes to perform effectively as a team, but lack necessary organizational resources or support. If the reward system provides incentives only for individual performance, for instance, the trainer must decide if s/he accepts this as a given or advises management on the possible negative impact on team performance.

A systemic view implies that managers take responsibility for the system elements under their control. Like trainers and team members, they need to recognize that they control parts of the organizational system that influence teams. They must have realistic expectations for training.

Managers must also accept personal responsibility for living the performance they expect from others. The bottom line is that management, the trainer, and the team must work together as a team for effective teamwork training to occur.

- **Focus on Performance**

Ultimately the success of any training program is judged by performance: whether the participants (team members) improved their ability to accomplish their goals. This judgment is made not by the trainers but by their customers, the team members, team leaders and the managers. Focusing on performance implies that all parties involved can come to some common understanding of what constitutes good teamwork. A focus on performance also implies that all parties, management, trainers and team members, practice, model, and reward good performance.

In keeping with a systems view of teamwork training, the role of the performance-oriented trainer may expand from focusing on internal team processes to helping the team identify stakeholders and negotiate boundaries, clarify its mission, goals, and the standards of performance its customers will use to judge its performance.

A focus on performance calls into question the many packaged activities available. While these activities may serve to stimulate group discussion, the trainer must carefully evaluate the extent to which team members can adequately transfer learning to their real world tasks. The best training activities address real team problems. The only way the trainer can relate training to required team performance is to have some idea of the team's critical processes and tasks and the required level of performance. To improve performance, team members need to know what

performance is expected of them and what good performance looks like. They also need time to practice good performance.

- **Design Quality In**

The low relationship between post-training evaluation activities and the significant relationship between participant-centered, on-going, performance-oriented evaluation implies the necessity of designing quality into the process from the beginning. Relying on outcome evaluations is like relying on inspections when the product comes off the line. Finding out after the fact that performance did not change or transfer to the job is too late; time and resources have been wasted; opportunities lost.

Designing quality in implies a clear understanding of what quality is, which relates directly back to a focus on performance. In keeping with a systemic, performance-oriented view, the trainer orchestrates continuous process evaluation and improvement, involving all interested parties. This may mean that the design teams decides what types of formal and informal reviews are necessary, at what times during the design and delivery process.

Designing quality in also implies that managers accept that quick fixes or one size fits all may not work. Managers may have to provide time and resources for experimentation and try out. Does this design work here, in this organization? If not, why not? How can the training be adapted, modified, improved?

- **Encourage Continuous Learning**

Findings confirmed the importance of feedback from trainer to team members and among team members, in a non-threatening environment.

This finding is also consistent with a systemic, quality performance orientation. Team members must understand what good performance is and how well they are performing. But the trainer will not always be around to provide constructive individual and team feedback. Team members must acquire the specific communication and self-management skills to monitor their own performance in relation to the team and its goals.

While trainers can model constructive feedback and provide opportunities for team members to understand and practice good skills, it is the responsibility of all, but especially managers, to create a non-threatening environment, an environment where mistakes are treated as opportunities for learning rather than blame.

Recommendations

Findings from this study suggest several other research questions which could be addressed in future studies on teamwork interventions. For example, the extent to which trainers' implicit views on the training process and teams influence design and implementation of teamwork training programs is not known. Qualitative case studies could explore in more depth the choices trainers make. How do trainers prioritize their activities? What are the bases for the decision they make and the meaning they assign to these activities?

A specific issue deserving more research relates to evaluation. Evaluation activities are among the least frequently performed activities, relative to other activities, yet trainers uniformly rate their training programs as successful. Outcome evaluation, the focus of most studies, did

not correlate significantly with perceived success. What evidence did trainers have to make these ratings? Areas to be explored could include the specific methods teamwork trainers use to collect data about the success of their training programs, the types of data collected, from whom data, and how the data is used to modify or adapt training.

Process evaluation also deserves more study. As indicated previously, although formative or process evaluation is a cornerstone of the systems approach, most research studies have looked at outcome evaluation methods. This study suggests that, at least for teamwork training, process evaluation is important. What constitutes effective process evaluation for teamwork training?

Another area for research is to evaluate the effectiveness of teamwork training from more than one perspective. This study relied on self-report data from teamwork trainers only. What activities do other involved parties perceive as necessary for success? What objective evidence exists about the effectiveness of teamwork training? To reduce the possibility of common method variance, data should be collected from a variety of data sources, including team members who have participated in teamwork training. their team leaders, supervisors and managers, and other teams with which the trained team. Objective evidence of team performance should also be collected.

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APPENDICES

APPENDIX A

EXPERT PANEL MEMBERS

Barbara Bessey, M.Ed.
Trng and Development Center
Linn-Benton-Community College
6500 Pacific Boulevard SW
Albany OR 97321
(503) 967-6112

Mark M. Greene, Ph.D.
Mark M. Greene & Associates
7150 SW Hampton St. # 214
Tigard, OR 97223
(503) 684-5144

Toni McConnell, Ph.D.
19600 View Drive
West Linn, OR 97068
(503) 635-7639

Susan Murray
Chemetketa Community College
1055 E Main
Silverton, OR 97381
(503) 873-3882

Margaret Savige, Ph.D.
120 S. 3rd Avenue
Clarion, PA 16214
(814) 226-6576

Julie Stenson, Ph.D.
Meristem Organization
Development
PO Box 2003
Corvallis, OR 97339
(503) 754-3576

Marsha Willard, Ph.D.
Axis Performance Advisors
15910 NE 270th St
Battle Ground WA 98604
206 687-3075

APPENDIX B
EXPERT PANEL MAILING

APPENDIX B
EXPERT PANEL MAILING

October 15, 1993

Dear :

Thank you for agreeing to help me with a study I am conducting under the direction of Dr. Ruth Stiehl, Professor of Education, Oregon State University.

Teamwork is one of the "hot" topics in training and development today. Yet, both researchers and practitioners point out the lack of clear and comprehensive guidelines for what teamwork training should be.

You are an expert in two complex and essential areas: instructional systems design and team training/team building. I am asking your help in refining a questionnaire to be sent to training professionals in Oregon. We will find out what trainers consider desirable and feasible when they design and deliver programs to enhance team performance.

Information about completing your review are included with the questionnaire.

Once you have completed your review, please return the questionnaire and your comments in the enclosed self-addressed, stamped envelope by October 27. (I can also pick up your comments directly if that would be easier for you). I will review all recommendations, make changes and return the revised questionnaire to you for additional input. You will receive a final copy of the questionnaire as well as a detailed copy of the results of the survey.

If you have any questions, please call me at home, (503) 745-7736 or leave a message at OSU (503) 737-6399. Again, thanks for your help.

Sincerely,

Corrine L. Gobeli
1485 NW Emperor Drive
Corvallis, OR 97331
(503) 745-7736

Instructions: Round 1

Your task is to review each item on this questionnaire and to determine if it is critical for designing and delivering effective teamwork training. Do you agree that the items are critical? Should other items be added? Should the items be modified or reworded to be more understandable to a practicing trainer? The items are based on a review of the literature on instructional systems design, teams, team building, team training, and adult learning as well as my own experience with teams in the workplace.

As you review the items, please consider the following definitions:

Design: a creative problem-solving process which focuses on how training and learning outcomes will be accomplished. Design activities include adaptations that occur during delivery/facilitation to respond to the unique conditions, needs, and interests of a particular team.

Effective Teamwork Training: structured training and development activities for team members which may occur on the job or in classroom settings which enhance individual and team performance.

Please respond to the items on the questionnaire as follows:

Accept: This item is critical for the design and delivery of effective teamwork training programs. Failure to consider this item may result in ineffective, inefficient teamwork training programs.

Reject: This item is not critical and not related to the effectiveness of teamwork training programs.

Modify: This item should be included, but only if it is modified (reworded, reordered) as noted.
Write changes in the space provided or on the separate Comment sheet.

Add other items here: This item is also critical and should be included.

What will happen next:

I will review all your comments and revise items. You will receive a revised questionnaire and will be asked (1) if you agree with the revisions and (2) to rate the revised items on a Likert-type scale. The final questionnaire will include only those items that achieve 75% agreement from the expert panel. The final questionnaire will be sent out to over 500 trainers in Oregon. We'll find out what actually is being done in teamwork training and what difficulties trainers are facing. You will receive a complete report of the results.

Thank you for your thoughts and suggestions.

Now, please review each major factor (in bold face) and the individual items. Respond as follows:

Accept: This item is critical for the design and delivery of effective teamwork training programs. Failure to consider this item may result in ineffective, inefficient teamwork training programs.

Reject: This item is not critical and not related to the effectiveness of teamwork training programs.

Modify: This item should be included, but only if it is modified (reworded, reordered) as noted. Note modifications in the space provided or on the Comments sheets.

Add other items here: This item is also critical and should be included.

Critical Design Factors for Effective Workplace Teamwork Training

When I design or deliver teamwork training for the workplace, I...

A. Spend considerable time analyzing the team's organizational environment _____Accept _____Reject _____Modify

1. work from a clear definition of what constitutes a team _____Accept _____Reject _____Modify
2. work from a model of team performance _____Accept _____Reject _____Modify
3. identify organizational factors which might impact teamwork and team performance _____Accept _____Reject _____Modify
4. consider how the team's goals fit with overall organizational strategy _____Accept _____Reject _____Modify
5. consider the impact of the organization's reward system on team performance _____Accept _____Reject _____Modify
6. consider the impact of the organization's information system on teamwork and team performance _____Accept _____Reject _____Modify
7. consider the resources the team has available to achieve its goal(s) _____Accept _____Reject _____Modify
8. consider the level of support for teamwork within the organization _____Accept _____Reject _____Modify
9. identify other groups with which the team must interact to achieve its goal(s) _____Accept _____Reject _____Modify
10. assess the nature of the interaction with these other groups _____Accept _____Reject _____Modify

Add other items which you feel are critical here.

When I design or deliver teamwork training for the workplace, I....

B. Involve team members in all aspects of the teamwork training process _____Accept _____Reject _____Modify

11. involve team members in the diagnosis and analysis of the team situation _____Accept _____Reject _____Modify

12. involve team members in the planning of teamwork training activities _____Accept _____Reject _____Modify

13. involve team members in the designing of teamwork training activities _____Accept _____Reject _____Modify

14. involve team members in the evaluation of teamwork training activities _____Accept _____Reject _____Modify

15. involve team members in the evaluation of their team's performance _____Accept _____Reject _____Modify

Add other items here.

C. Conduct a formal task analysis to determine the content of the training program _____Accept _____Reject _____Modify

16. determine how the nature of the team's task affects team interaction _____Accept _____Reject _____Modify

17. determine how the nature of the team's task influences the interdependencies of team members _____Accept _____Reject _____Modify

18. determine how team members depend on one another in order to accomplish tasks and goals _____Accept _____Reject _____Modify

19. identify the potential impact of technology on team processes _____Accept _____Reject _____Modify

20. determine the impact of work flow on team processes _____Accept _____Reject _____Modify

21. identify the specific technical competencies required by the team's task _____Accept _____Reject _____Modify

22. identify the specific task-work competencies required by the team's task _____Accept _____Reject _____Modify

23. identify the specific teamwork competencies required by the team's task _____Accept _____Reject _____Modify

Add other items here.

When I design or deliver teamwork training for the workplace, I....

D. Analyze the individual characteristics of team members _____Accept _____Reject _____Modify

24. assess the entry level task work skills of individual team members _____Accept _____Reject _____Modify

25. assess the entry level team work skills of individual team members _____Accept _____Reject _____Modify

26. assess team members' attitudes toward their team _____Accept _____Reject _____Modify

27. assess team members' expectations for teamwork training activities _____Accept _____Reject _____Modify

28. identify team members' perceptions about what constitutes an effective team _____Accept _____Reject _____Modify

29. identify team members' perceptions about what constitutes teamwork _____Accept _____Reject _____Modify

Add other items here.

E. Analyze the design and structure of the team _____Accept _____Reject _____Modify

30. clarify individual team members' roles and responsibilities on the team _____Accept _____Reject _____Modify

31. consider the potential impact of the number of team members on team performance _____Accept _____Reject _____Modify

32. consider the potential impact of the composition of the team on team performance _____Accept _____Reject _____Modify

33. consider how long team members have worked together as a team _____Accept _____Reject _____Modify

34. determine who takes on leadership functions _____Accept _____Reject _____Modify

35. analyze the critical leadership skills and behaviors appropriate for the team's goals and task _____Accept _____Reject _____Modify

36. determine the norms or ground rules of the team _____Accept _____Reject _____Modify

37. consider how committed the team is to its goal _____Accept _____Reject _____Modify

38. consider how committed the team members are to the team as a unit _____Accept _____Reject _____Modify

39. analyze the team's communication structure (who communicates to whom about what and in what manner) _____Accept _____Reject _____Modify

Add other items here.

When I design or deliver teamwork training for the workplace, I...

F. Analyze how the team conducts its work (team processes) ____Accept ____Reject ____Modify

40. determine how the team coordinates its work ____Accept ____Reject ____Modify

41. use graphic representations (timelines, flow charts, critical paths) to demonstrate team interdependencies ____Accept ____Reject ____Modify

42. identify existing task performance strategies ____Accept ____Reject ____Modify

43. determine the specific performance strategies correlated with effective team performance ____Accept ____Reject ____Modify

44. consider the team's problem solving strategies ____Accept ____Reject ____Modify

45. consider the team's decision-making processes ____Accept ____Reject ____Modify

46. consider the team's conflict managment strategies ____Accept ____Reject ____Modify

47. determine the specific communication behaviors which lead to effective team performance ____Accept ____Reject ____Modify

Add other items here.

G. Create complex and real-world teamwork training activities ____Accept ____Reject ____Modify

48. prepare performance-based instructional objectives ____Accept ____Reject ____Modify

49. ensure that all team members participate in training ____Accept ____Reject ____Modify

50. provide opportunities for team members to articulate their team's goals ____Accept ____Reject ____Modify

51. provide opportunities for team members to reconcile their individual goals with team goals ____Accept ____Reject ____Modify

52. provide opportunities to clarify each team member's roles and responsibilities ____Accept ____Reject ____Modify

53. emphasize training on tasks that require team interaction ____Accept ____Reject ____Modify

54. provide opportunities to cross train individual team members ____Accept ____Reject ____Modify

55. provide opportunities for team members to get to know each other's interaction styles ____Accept ____Reject ____Modify

56. provide opportunities for team members to understand the different factors which may influence their team's performance ____Accept ____Reject ____Modify

When I design or deliver teamwork training for the workplace, I...

57. create customized training activities, based on real-life team problems _____Accept _____Reject _____Modify

58. provide activities which require cooperative action in order to be completed successfully _____Accept _____Reject _____Modify

59. provide opportunities for team members to observe examples of exemplary team work _____Accept _____Reject _____Modify

60. provide activities and scenarios to practice conflict management _____Accept _____Reject _____Modify

61. provide activities with several different possible strategies for solution _____Accept _____Reject _____Modify

62. provide activities which include unexpected events _____Accept _____Reject _____Modify

63. provide activities which require team members to anticipate the needs of others _____Accept _____Reject _____Modify

64. provide activities so that team members understand the need to ask for help when necessary _____Accept _____Reject _____Modify

65. provide specific means for team members to monitor team strategies for accomplishing work. _____Accept _____Reject _____Modify

66. provide opportunities for team members to learn to teach others _____Accept _____Reject _____Modify

67. ensure that all instructors/facilitators model effective communication behavior _____Accept _____Reject _____Modify

68. provide on-going training as needed _____Accept _____Reject _____Modify

69. provide opportunities for follow-up training to ensure maintenance of skills _____Accept _____Reject _____Modify

Add other items here.

H. Consider the unique needs of adults as learners _____Accept _____Reject _____Modify

70. pay careful attention to the physical setting or environment in which training takes place _____Accept _____Reject _____Modify

71. pay attention to the social environment created by instructor/facilitator interaction with trainees _____Accept _____Reject _____Modify

72. relate training activities to past experiences of the team members _____Accept _____Reject _____Modify

73. actively incorporate instructional techniques to accommodate different learning rates _____Accept _____Reject _____Modify

74. actively incorporate instructional techniques to accommodate different learning styles _____Accept _____Reject _____Modify

When I design and deliver teamwork training for the workplace, I...

75. use instructional techniques to accommodate different levels of skills among team members ____Accept ____Reject ____Modify

76. create opportunities for regular and frequent practice of teamwork skills ____Accept ____Reject ____Modify

77. create opportunities for team members to accomplish simpler tasks before moving on to more complex tasks ____Accept ____Reject ____Modify

78. encourage team members to reflect critically on their team experiences ____Accept ____Reject ____Modify

79. provide the opportunity for teams to make mistakes and to learn from them ____Accept ____Reject ____Modify

80. provide opportunites for team members to experience the whole teamwork task ____Accept ____Reject ____Modify

81. provide job aids or other performance supports for teamwork skills ____Accept ____Reject ____Modify

Add other items here.

I. Provide feedback throughout training ____Accept ____Reject ____Modify

82. provide feedback on all important aspects of team performance ____Accept ____Reject ____Modify

83. provide feedback to individual team members ____Accept ____Reject ____Modify

84. provide overall feedback to the team ____Accept ____Reject ____Modify

85. prepare team members to accept constructive feedback from other team members ____Accept ____Reject ____Modify

86. prepare team members to give constructive feedback to other team members ____Accept ____Reject ____Modify

87. encourage the use of positive statements about individual and team performance ____Accept ____Reject ____Modify

Add other items here.

K. Evaluate the teamwork training process ____Accept ____Reject ____Modify

88. test instructional materials and programs as they are being developed ____Accept ____Reject ____Modify

89. pilot test teamwork training programs before full-scale implementation ____Accept ____Reject ____Modify

When I design or deliver teamwork training for the workplace, I...

90. use trainee feedback and measures of performance to modify training programs _____Accept _____Reject _____Modify

91. tie evaluation measures to performance objectives _____Accept _____Reject _____Modify

92. provide opportunities for team members to rate their overall satisfaction with teamwork training activities _____Accept _____Reject _____Modify

93. evaluate team members' satisfaction with facilitation of teamwork training activities _____Accept _____Reject _____Modify

94. evaluate the extent to which teamwork training results in changes in teamwork behavior _____Accept _____Reject _____Modify

95. evaluate the extent to which teamwork training activities result in improved team performance _____Accept _____Reject _____Modify

96. evaluate the extent to which teamwork training activities relate to improved productivity _____Accept _____Reject _____Modify

Add other items here.

J. Evaluate team performance _____Accept _____Reject _____Modify

97. evaluate the extent to which the team meets its team goals _____Accept _____Reject _____Modify

98. evaluate the extent to which the team's results meet organizational goals _____Accept _____Reject _____Modify

99. evaluate the overall productivity of the team _____Accept _____Reject _____Modify

100. evaluate the quality of the team's output _____Accept _____Reject _____Modify

101. evaluate whether the team meets its time deadlines _____Accept _____Reject _____Modify

102. evaluate the cost effectiveness of the team's efforts _____Accept _____Reject _____Modify

103. evaluate the extent to which individual team member's goals are achieved _____Accept _____Reject _____Modify

104. evaluate the extent to which team members successfully perform teamwork skills _____Accept _____Reject _____Modify

105. evaluate individual team member's satisfaction with achievement of team's goals _____Accept _____Reject _____Modify

106. evaluate individual team member's satisfaction with the team process _____Accept _____Reject _____Modify

107. evaluate the ability of the team to work together in the long-term _____Accept _____Reject _____Modify

Add other items here.

Please indicate the extent to which the conditions described below make it difficult for you to design and deliver effectiv e teamwork training in the workplace.

108. teamwork is not part of management strategy. _____Accept _____Reject _____Modify

109. management doesn't support teamwork training ____Accept _____Reject _____Modify

110. managers and supervisors do not model effective teamwork skills _____Accept _____Reject _____Modify

111. reward systems don't support teamwork _____Accept _____Reject _____Modify

112. lack of funding for teamwork training _____Accept _____Reject _____Modify

113. insufficient development time _____Accept _____Reject _____Modify

114. insufficient training time _____Accept _____Reject _____Modify

115. shortage of staff _____Accept _____Reject _____Modify

116. lack of staff expertise _____Accept _____Reject _____Modify

117. lack of consultant expertise _____Accept _____Reject _____Modify

Add other items here.

Please indicate your perception of the effectiveness of your teamwork training programs.

118. Overall, management is satisfied with the results of the team work training programs we conduct. _____Accept _____Reject _____Modify

119. Overall, team members are satisfied with the team work training programs we conduct. _____Accept _____Reject _____Modify

120. Overall, I am satisfied with the results of the teamwork training programs we conduct. _____Accept _____Reject _____Modify

Add other items here.

Do you have other comments or suggestions about the questionnaire? If so, please note them on the Comments sheet

Thank you for your constructive criticism, creativity, and cooperation.

APPENDIX C
HUMAN SUBJECTS REQUEST

To: Oregon State University Review Board for the Protection of Human Subjects

From: Corrine L. Gobeli, Doctoral candidate, School of Education
503-745-7736

Project Title: Critical Design Factors for Effective Teamwork Training in the Workplace: A Survey of Training Professionals in Oregon

1. Project Description

Teams are a key component of high performance organizations; high performance organizations are a key component of Oregon's strategy for long-term economic development. Few clear guidelines, however, exist to help training professionals design programs to enhance team performance.

This survey will help to identify the factors that training professionals in Oregon consider both critical and feasible when designing and delivering teamwork training programs. It will also help to identify the situational constraints (barriers or challenges) that make it ddifficult for trainers to perform their teamwork training jobs. We will gain insight into the state of teamwork training in Oregon: what is done, what works and the challenges that trainers face.

2. Methods and Procedures

This is a descriptive study, using a researcher-developed questionnaire.
The questionnaire items are based in a literature review and professional experience. An initial 120 items were reviewed by members of my graduate committee and by a seven member expert panel. The draft questionnaire of 74 teamwork training items and 11 demographic items was subjected to one-on-one review by three graduates of the Training and Development program of OSU. It is currently being reviewed by the Survey Research Center. A pilot test will be conducted the week of December 11. The final questionnaire will incorporate changes recommended by the T&D reviewers, the SRC and the pilot test participants.

The timetable is to mail the final questionnaire the first week of January, 1994.

APPENDIX C (Continued)

3. Benefits and/or risks

There are no risks associated with completing this questionnaire. As a benefit, each participant may request a copy of the survey results. These results can be used to benchmark his/her practices. The questionnaire also serves as a relatively complete, systematic listings of issues relating to teamwork training. It can be used as a checklist when designing and delivering teamwork training programs.

4. Subject Population

The research population consists of approximately 550 members of two professional training associations in Oregon: the American Society of Training and Development (ASTD) and the National Society of Performance and Instruction (NSPI). Mailing lists have been purchased from ASTD and provided by NSPI. The sample will be those trainers who are currently providing teamwork training either as in-house or as external consultants.

5/6. Informed Consent

The subjects will be informed of the requirements of participation in the survey cover letter (attached). Consent will be given by their return of the survey.

7. Confidentiality

Subjects' anonymity will be maintained by coding each survey instrument and using the codes for the collection and analysis of the data. A list of subjects and their codes will be kept only by the researcher; the subjects' names and posisitons will never be used in the results of the study. Only aggregate descriptive statistical data or anonymous qualitative data will be reported.

8. Questionnaire and related materials

Copies of the cover letter, follow-up letters and the questionnaire are attached. As indicated in #2, the questionnaire will be modified based on feedback from the SRC and pilot test.

OFFICE OF DEAN OF RESEARCH

OREGON STATE UNIVERSITY
Administrative Services A312 · Corvallis, Oregon · 97331-2140
503-737-3437 · FAX 503-737-3093 · INTERNET scanlanr@ccmail.orst.edu

December 9, 1993

Principal Investigator:

The following project has been approved for exemption under the guidelines of Oregon State University's Committee for the Protection of Human Subjects and the U.S. Department of Health and Human Services:

Principal Investigator: Ruth Stiehl

Student's Name (if any): Corrinne L. Gobeli

Department: Education

Source of Funding:

Project Title: Critical Design Factors for Effective Teamwork Training in the Workplace: A Survey of Training Professionals in Oregon

Comments:

A copy of this information will be provided to the Chair of the Committee for the Protection of Human Subjects. If questions arise, you may be contacted further.

Redacted for privacy

Mary E. Nunn
Sponsored Programs Officer

cc: CPHS Chair

APPENDIX D
SURVEY PACKET

APPENDIX D

INITIAL COVER LETTER TO WORKPLACE TRAINERS
(on Oregon State University, School of Education, Letterhead)

Dear «name»:

Teams are generally recognized today as essential to high performance organizations, but few clear and comprehensive guidelines exist for designing training programs to enhance team performance.

I am asking your assistance in a research project to identify the critical design factors for effective teamwork training. Through this project, developed under the direction of professors Ruth Stiehl and Henry Sredl, we will learn more about what you, as a member of the training and development community in Oregon, have found to be both desirable and feasible when training teams.

The enclosed questionnaire includes items about the design of teamwork training programs. What do you actually do when working with teams? What do you believe it is important to do? What challenges do you face?

On the basis of pilot tests, the questionnaire will take about 25 minutes to complete. Your responses will be confidential; an identification number on the questionnaire will only be used to send follow-up reminders.

If you would like a summary of the results, include a copy of your business card or write "Copy of Results" on the back of the postage-paid return envelope and print your name and address below it. Please **do not** put your name and address on the questionnaire itself.

The success of this study depends on your response. Please return your survey as soon as possible. If you have any comments or questions, call me at OSU, (503)737-6399 or at home, (503)745-7736.

Sincerely,

Corrine Gobeli
School of Education
Oregon State University
Corvallis, OR 97331
(503)737-6399, (503)745-7736

CRITICAL DESIGN FACTORS
FOR EFFECTIVE TEAMWORK TRAINING
IN THE WORKPLACE

A Survey of Training Professionals
1994

Conducted by
School of Education
Oregon State University
Corvallis, OR 97331

Researcher:
Corrine Gobeli

Critical Design Factors for Effective Teamwork Training in the Workplace

Definitions:

For this questionnaire a *team* is two or more people who commit to working together, interdependently, to achieve a common goal. *Teamwork training* is structured training and development activities which occur on the job or in classroom settings to enhance team performance. *Design* is a creative problem-solving process to determine how training and learning outcomes will be accomplished. Design actitivities include adaptations that occur during delivery/facilitation to respond to the unique conditions, needs, and interests of a particular team.

Involvement with Teamwork Training: General

A. Does your organization* currently organize employees into teams? (Circle one number.)

* *If you are an external consultant, please answer the questions in terms of your primary client(s) at this time.*

1 YES
2 NO

B. Approximately what percentage of the employees in your organization are members of teams? Write in your best estimate.

_____% of our employees are members of teams.

C. Do you design or deliver/facilitate programs designed to enhance team performance? (Circle one number.)

1 YES (Please turn to the next page.....)
2 NO →

Since our purpose is to learn more about design and delivery of teamwork training programs, you do not need to complete the remainder of the questions. However, we would like to know more about you and would appreciate any comments you might like to make that would help us learn more about teamwork training. Please turn to PAGE 6, QUESTION 6.

1. Critical Design Factors

For each task listed below, first indicate the frequency with which you **actually perform** this task when designing or delivering teamwork training; then indicate how **important** or critical you believe this task is to effective teamwork training. For example, consider the task " Provide follow-up training." You may respond that you are able to do this only "Sometimes" even though you believe it is "Very Important" to long-term team training effectiveness. Use the five-point scales described to the right.

Circle the one number that best describes (A) how frequently you perform the task and (B) how important you believe it is to effective teamwork training.

A Frequency					B Importance				
Never	Almost Never	Sometimes	Nearly Always	Always	Very unimportant	Unimportant	Neither important nor unimportant	Important	Very important
N	AN	S	NA	A	VU	U	N	I	VI
1	2	3	4	5	1	2	3	4	5

When I design or deliver teamwork training for the workplace, I...	A Frequency *(Circle one number)*					B Importance: *(Circle one number)*				
A. Analyze the team's environment	N	AN	S	NA	A	VU	U	N	I	VI
a. Define what constitutes a team within the organization	1	2	3	4	5	1	2	3	4	5
b. Use model(s) of team performance appropriate to the organization	1	2	3	4	5	1	2	3	4	5
c. Identify organizational factors which might impact teamwork	1	2	3	4	5	1	2	3	4	5
d. Consider how the team's goals fit with overall organizational strategy	1	2	3	4	5	1	2	3	4	5
e. Consider the impact of the organization's reward system on teamwork	1	2	3	4	5	1	2	3	4	5
f. Consider the impact of the organization's information system on teamwork	1	2	3	4	5	1	2	3	4	5
g. Consider the resources the team has available to achieve its goal(s)	1	2	3	4	5	1	2	3	4	5
h. Assess management's willingness to implement team recommendations	1	2	3	4	5	1	2	3	4	5
i. Identify other groups with which the team must interact to achieve its goal(s)	1	2	3	4	5	1	2	3	4	5
j. Involve team members in analyzing the team situation	1	2	3	4	5	1	2	3	4	5
B. Analyze the team and its task										
a. Determine how the team's task affects team interaction	1	2	3	4	5	1	2	3	4	5
b. Identify how technology might impact team processes	1	2	3	4	5	1	2	3	4	5
c. Determine the impact of work flow on teamwork	1	2	3	4	5	1	2	3	4	5
d. Identify the specific teamwork skills required by the team's task	1	2	3	4	5	1	2	3	4	5
e. Assess the existing teamwork skills of individual team members	1	2	3	4	5	1	2	3	4	5
f. Identify team members' attitudes toward their team	1	2	3	4	5	1	2	3	4	5
g. Identify team members' expectations for teamwork training	1	2	3	4	5	1	2	3	4	5
h. Clarify individual team members' responsibilities on the team	1	2	3	4	5	1	2	3	4	5

Please go the the next page.....

When I design or deliver teamwork training for the workplace, I...	A Frequency					B Importance				
B. Analyze the team and task(cont.)	N	AN	S	NA	A	VU	U	N	I	VI
i. Consider the critical leadership behaviors appropriate for the team's goals	1	2	3	4	5	1	2	3	4	5
j. Consider how committed the team members are to the team as a unit	1	2	3	4	5	1	2	3	4	5
k. Determine the specific communication behaviors which lead to effective team performance	1	2	3	4	5	1	2	3	4	5
l. Determine how the team coordinates its work	1	2	3	4	5	1	2	3	4	5
m. Identify the team's **problem solving** strategies	1	2	3	4	5	1	2	3	4	5
n. Identify the team's **decision-making** processes	1	2	3	4	5	1	2	3	4	5
o. Identify the team's **conflict management** strategies	1	2	3	4	5	1	2	3	4	5
C. Create complex and real-world teamwork training activities										
a. Prepare performance-based instructional objectives	1	2	3	4	5	1	2	3	4	5
b. Encourage all team members to participate in training	1	2	3	4	5	1	2	3	4	5
c. Create customized training activities, based on real-life team problems	1	2	3	4	5	1	2	3	4	5
d. Provide opportunities for team members to clarify their team's goals	1	2	3	4	5	1	2	3	4	5
e. Provide opportunities to clarify each team member's responsibilities	1	2	3	4	5	1	2	3	4	5
f. Emphasize training on tasks that require team interaction	1	2	3	4	5	1	2	3	4	5
g. Provide opportunities for team members to get to know each other's interaction styles	1	2	3	4	5	1	2	3	4	5
h. Provide activities to practice conflict management	1	2	3	4	5	1	2	3	4	5
i. Provide activities with several different possible strategies for solution	1	2	3	4	5	1	2	3	4	5
j. Provide activities so that team members understand the need to ask for help when necessary	1	2	3	4	5	1	2	3	4	5
k. Ensure that all instructors/facilitators model effective communication behavior	1	2	3	4	5	1	2	3	4	5
l. Provide opportunities for follow-up training to ensure maintenance of skills	1	2	3	4	5	1	2	3	4	5
m. Identify ways to incorporate training into real-time work activities (just-in-time training)	1	2	3	4	5	1	2	3	4	5
D. Consider the unique needs of adult learners										
a. Pay attention to the social environment created by instructor/facilitator interaction with trainees	1	2	3	4	5	1	2	3	4	5
b. Relate training activities to past experiences of team members	1	2	3	4	5	1	2	3	4	5
c. Actively incorporate instructional techniques to accommodate different learning style preferences	1	2	3	4	5	1	2	3	4	5
d. Use instructional techniques to accommodate different skill levels among team members	1	2	3	4	5	1	2	3	4	5
e. Create opportunities for regular and frequent practice of teamwork skills	1	2	3	4	5	1	2	3	4	5
f. Create opportunities for team members to accomplish simpler tasks before moving on to more complex tasks	1	2	3	4	5	1	2	3	4	5

Please go to the next page.....

When I design or deliver teamwork training for the workplace, I....	A Frequency					B Importance				
D. Consider the adult learner (cont.)	N	AN	S	NA	A	VU	U	N	I	VI
g. Encourage team members to reflect critically on their team experiences	1	2	3	4	5	1	2	3	4	5
h. Provide situations for teams to learn from mistakes in a non-threatening environment	1	2	3	4	5	1	2	3	4	5
i. Provide opportunities for team members to work through the whole team task	1	2	3	4	5	1	2	3	4	5
j. Provide feedback on important aspects of team performance	1	2	3	4	5	1	2	3	4	5
k. Provide feedback to individual team members	1	2	3	4	5	1	2	3	4	5
l. Prepare team members to **accept** constructive feedback from other team members	1	2	3	4	5	1	2	3	4	5
m. Prepare team members to **give** constructive feedback to other team members	1	2	3	4	5	1	2	3	4	5
E. Encourage continuous improvement										
a. Pilot test teamwork training programs before full-scale implementation	1	2	3	4	5	1	2	3	4	5
b. Use trainee feedback to modify training programs	1	2	3	4	5	1	2	3	4	5
c. Tie evaluation measures to performance objectives	1	2	3	4	5	1	2	3	4	5
d. Provide opportunities for team members to rate their satisfaction with teamwork training activities	1	2	3	4	5	1	2	3	4	5
e. Evaluate the extent to which teamwork training results in changes in teamwork **behavior**	1	2	3	4	5	1	2	3	4	5
f. Evaluate the extent to which teamwork training activities result in improved team **performance**	1	2	3	4	5	1	2	3	4	5
g. Evaluate the extent to which the team meets its team goals	1	2	3	4	5	1	2	3	4	5
h. Evaluate the extent to which teamwork training activities relate to improved **productivity**	1	2	3	4	5	1	2	3	4	5
i. Evaluate individual team member's satisfaction with the team process	1	2	3	4	5	1	2	3	4	5
j. Evaluate the ability of the team to work together in the long-term	1	2	3	4	5	1	2	3	4	5

Tell us more about your teamwork training experiences:

2. Describe briefly the best teamwork training experience you have had. What made it the best?

3. Describe briefly the worst teamwork training experience you have had. What made it the worst?

Please go to the next page.....

4. Barriers

Another important purpose of this study is to learn more about organizational factors which might affect how you design and deliver training programs. Please indicate how much, in your experience, the conditions described below are barriers to you in designing and delivering effective teamwork training in the workplace. Use the following scale: **1 = not a barrier; 2 = not much of a barrier; 3 = somewhat of a barrier; 4 = serious barrier**(Circle one number for each statement.)

	Not a barrier	Not much of a barrier	Somewhat of a barrier	Serious barrier
a. Teamwork is not part of management strategy	1	2	3	4
b. Management does not support teamwork training	1	2	3	4
c. Managers/supervisors resist changes in power relationships	1	2	3	4
d. Teamwork means different things to different people in the organization	1	2	3	4
e. Managers and supervisors do not model effective teamwork skills	1	2	3	4
f. Management expects a "quick-fix" solution	1	2	3	4
g. Our reward systems do not support teamwork	1	2	3	4
h. The organization's training budget is insufficient	1	2	3	4
i. I do not have enough time to develop customized teamwork training programs	1	2	3	4
j. We do not spend enough time providing teamwork training	1	2	3	4
k. I do not have enough staff to provide teamwork training	1	2	3	4
l. There is little or no follow-up of training on the job	1	2	3	4
m. Other (please specify_____ _____	1	2	3	4

5. Teamwork Training Success

How successful or unsuccessful would you rate your teamwork training programs, according to each of the following criteria? (Circle one number for each.)

	Unsuccessful	Somewhat Unsuccessful	Somewhat Successful	Successful	Don't Know
a. I am satisfied with the results of our teamwork training	1	2	3	4	9
b. Team members enjoy teamwork training activities	1	2	3	4	9
c. Team members find teamwork training useful	1	2	3	4	9
d. Team members work together better after teamwork training	1	2	3	4	9
e. Teams members communicate better after teamwork training	1	2	3	4	9
f. Team members are satisfied with their team performance	1	2	3	4	9
g. Teams achieve performance goals	1	2	3	4	9
h. Teams contribute more to organizational productivity after teamwork training	1	2	3	4	9
i. Managers are satisfied with teamwork training	1	2	3	4	9

Please go to the next page.....

6. And now, some background questions about you and your organization to help us clarify and summarize our results. * *If you are an external consultant, please answer the questions in terms of your primary client(s) at this time.*

A. Please indicate your level of involvement with teamwork training. (Circle one number.)

1 I do not design or deliver teamwork training programs (SKIP TO QUESTION C)
2 I deliver/facilitate off-the-shelf teamwork training programs (for example, Zenger Miller, DDI, etc.).
3 I deliver/facilitate teamwork training programs that have been designed in-house.
4 I design and deliver customized teamwork training programs.
5 Other (Please Specify)_____

B. Please indicate whether or not you provide teamwork training for each of the following groups of employees.

	DON'T PROVIDE	DO PROVIDE
01 Production workers	1	2
02 Customer service workers	1	2
03 Salespeople	1	2
04 Office/administrative workers	1	2
05 Professionals	1	2
06 First-line supervisors	1	2
07 Middle managers	1	2
08 Senior managers	1	2
09 Executives	1	2
10 Students	1	2
11 Other (Please Specify_____	1	2

C. Circle the one number that most accurately describes your organization's business.

01 Manufacturing
02 Agriculture/forest products/mining
03 Communication/transportation/utilities
04 Wholesale/retail trade/hospitality
05 Finance/insurance/real estate
06 Health services
07 Business services
08 Education
09 Government/military
10 Other (please specify)_____

D. How many employees are there in your organization? (Circle one number.)

1 LESS than 50
2 50-99
3 100-499
4 500-999
5 1000 OR OVER

Please go to the next page.....

E. Circle the number that best describes your primary job responsibilities.

1 Training/HRD manager/director
2 Instructional designer/developer
3 Instructor/Facilitator/teacher
4 Training/HRD generalist
5 Training/HRD consultant
6 Other (Please specify)_____

F. How many years have you worked in the HRD/training field? (Circle one number)

1 This is my first year
2 1-4 years
3 5-10 years
4 More than 10 years

G. What is your highest level of education? (Circle one number)

1 Professional certificate
2 Bachelor's degree
3 Master's
4 Doctorate
5 Other (Please specify) _____

H. Circle the one number that best describes how you learned about instructional systems design.

1 On-the-job experience
2 Self-directed, independent study
3 Academic program
4 Professional workshops, seminars, conferences
5 Other (Please specify) _____

I. Circle the one number that best describes how you learned about teamwork training.

1 On-the-job-experience
2 Self-directed, independent study
3 Academic program
4 Professional workshops, seminars, conferences
5 Other (Please specify)_____

J. Your gender? (Circle one number)

1 Male
2 Female

That's it! Thank you for your time and cooperation.

Remember, if you would like a summary of the results, include a business card or write "Copy of Results" and your name and address on the back of the return envelope.
Do not write your name on the questionnaire.

APPENDIX E

SURVEY REMINDER POST CARD

January 18, 1994

Last week I sent you a questionnaire asking about the critical design factors in teamwork training. If you have already completed and returned the survey, thank you very much for your valuable assistance.

But if you haven't yet returned the survey, please do so today. It should take only 25 minutes to complete. Your views are essential to this study on teamwork training practices. Your responses will remain strictly confidential.

Thanks for your cooperation.

Corrine Gobeli, Research Coordinator
School of Education, Oregon State University
Corvallis, OR 97331
(503) 737-6399
(503) 745-7736

APPENDIX F

SURVEY FOLLOW-UP LETTER

Dear :

Several weeks ago I sent you a questionnaire on critical design factors for teamwork training programs. I want to make sure you got a copy and have an opportunity to contribute to the study. You're a vital part of Oregon's effort to develop high performance organizations--and I want to include your experience and comments.

In case your questionnaire has been misplaced, a replacement questionnaire and a convenient postage-paid rely envelope are enclosed. You may also telephone 503 737-6399 (OSU) 503-745-7736 (home) with questions or other information.

It should take only 25 minutes or so to fill out the questionnaire. Remember, if you'd like a copy of the results, write your name and address on the back of the return envelope.

Many thanks for your cooperation. I'm looking forward to hearing from you.

Sincerely,

Corrine Gobeli
School of Education
Oregon State University
Corvallis, OR 97331
503-737-6399
503-745-7736

APPENDIX G

Mean Ratings, Frequencies and Percentages for Frequency of Performance Measure

Item	*Mean* *SD*	frequency (percentage)					*n*
		1	2	3	4	5	
A. Analyze the teams' environment							
Aa. Define what constitutes a team within the organization	4.03 .91	1 .7	6 4.5	29 21.6	50 37.3	48 35.8	134
Ab. Use model(s) of team performance appropriate to the organization	3.86 .89	2 1.5	6 4.5	32 24.1	61 45.9	32 24.1	133
Ac. Identify organizational factors which might impact teamwork	4.25 .77		3 2.2	18 13.4	55 41.0	58 43.3	134
Ad. Consider how the team's goals fit with overall organizational strategy	4.27 .81		3 2.2	21 15.7	47 35.1	63 47.0	134
Ae. Consider the impact of the organization's reward system on teamwork	3.48 1.00	3 2.2	20 14.9	42 31.3	48 35.8	21 15.7	134
Af. Consider the impact of the organization's information system on teamwork	3.54 1.04	4 3.0	16 11.9	46 34.3	40 29.9	28 20.9	134
Ag. Consider the resources the team has available to achieve its goal(s)	4.12 .78		3 2.2	24 17.9	61 45.5	46 34.3	134
Ah. Assess management's willingness to implement team recommendations	4.16 .91	1 .7	6 4.5	22 16.4	46 34.3	59 44.0	134
Ai. Identify other groups with which the team must interact to achieve its goal(s)	3.92 .94	3 2.2	5 3.7	32 23.9	54 40.3	40 29.9	134
Aj. Involve team members in analyzing the team situation	4.34 .84	1 .7	2 1.5	20 14.9	38 28.4	73 54.5	134
B. Analyze the team and its task							
Ba. Determine how the team's task affects team interaction	3.75 .86		10 7.5	39 29.3	58 43.6	26 19.5	133
Bb. Identify how technology might impact team processes	3.27 .827	3 2.2	13 9.8	72 54.1	35 26.3	10 7.5	133
Bc. Determine the impact of workflow on teamwork	3.85 .89		10 7.6	34 25.8	54 40.9	34 25.8	13
Bd. Identify the specific teamwork skills required by the team's task	3.94 .91		9 6.8	32 24.1	50 37.6	42 31.6	133
Be. Assess the existing teamwork skills of individual team members	3.58 .97	1 .7	16 11.9	48 35.8	42 31.3	27 20.1	134

APPENDIX G (Continued)

Bf. Identify team members' attitudes toward their team	3.87 .99	1 .7	11 8.2	36 26.9	43 32.1	43 32.1	134
Bg. Identify team members' expectations for teamwork training	3.92 .92	1 .7	8 6.0	32 23.9	52 38.3	41 30.6	134
Bh. Clarify individual team members' responsibilities on the team	4.20 .83	1 .7	1 .7	26 19.4	48 35.8	58 43.3	134
Bi. Consider the critical leadership behaviors appropriate for the team's goals	3.90 .84		5 3.7	39 29.1	54 40.3	36 26.9	134
Bj. Consider how committed the team members are to the team as a unit	3.92 .92	1 .7	9 6.7	29 21.6	56 41.8	39 29.1	134
Bk. Determine the specific communication behaviors which lead to effective team performance	4.04 .96	1 .7	7 5.2	32 23.9	40 29.9	54 40.3	134
Bl. Determine how the team coordinates its work	3.62 .86		12 9.1	47 35.6	52 39.4	21 15.9	132
Bm. Identify the team's problem solving strategies	4.06 .84		6 4.5	25 18.8	57 42.9	45 33.8	133
Bn. Identify the team's decision-making processes	4.11 .83		5 3.8	24 18.2	54 40.9	49 37.1	132
Bo. Identify the team's conflict management strategies	3.95 .93		9 6.8	34 25.6	45 33.8	45 33.8	133
C. Create complex and real-world teamwork training activities							
Ca. Prepare performance-based instructional objectives	3.66 1.05	3 2.3	15 11.5	38 29.0	42 32.1	33 25.2	131
Cb. Encourage all team members to participate in training	4.47 .73		2 1.5	13 9.7	39 29.1	80 59.7	134
Cc. Create customized training activities, based on real-life team problems	4.06 .92	2 1.5	7 5.2	20 14.9	57 42.5	48 35.8	134
Cd. Provide opportunities for team members to clarify their team's goals	4.16 .83	1 .7	3 2.2	22 16.4	55 41.0	53 39.6	134
Ce. Provide opportunities to clarify each team member's responsibilities	4.01 .77		3 2.3	29 22.1	62 47.3	37 28.2	131
Cf. Emphasize training on tasks that require team interaction	3.79 .87		10 7.6	36 27.5	56 42.7	29 22.1	131
Cg. Provide opportunities for team members to get to know each other's interaction styles	4.04 .90		7 5.3	30 22.6	46 34.6	50 37.6	133

APPENDIX G (Continued)

Ch. Provide activities to practice conflict management	3.54 .96	2 1.5	17 13.0	41 31.3	50 38.2	21 16.0	131
Ci. Provide activities with several different possible strategies for solution	3.6 1.004	2 1.5	15 11.5	44 33.6	41 31.3	29 22.1	131
Cj. Provide activities so that team members understand the need to ask for help when necessary	3.41 .91	1 .8	19 14.4	53 40.2	43 32.6	16 12.1	132
Ck. Ensure that all instructors/facilitators model effective communication behavior	4.28 .85	1 .7	4 3.0	17 12.7	46 34.3	66 49.3	134
Cl. Provide opportunities for follow-up training to ensure maintenance of skills	3.49 1.00	3 2.2	20 14.9	40 29.9	50 37.3	21 15.7	134
Cm. Identify ways to incorporate training into real-time work activities (just-in-time training)	3.71 .93		14 10.5	39 29.3	51 38.3	29 21.8	133
D. Consider the unique needs of adult learners							
Da. Pay attention to the social environment created by instructor/facilitator interaction with trainees	4.22 .84		4 3.0	23 17.3	46 34.6	60 45.1	133
Db. Relate training activities to past experiences of team members	4.15 .74		2 1.5	22 16.4	64 47.8	46 34.3	134
Dc. Actively incorporate instructional techniques to accommodate different learning style preferences	4.01 .871		7 5.2	29 21.6	54 40.3	44 32.8	134
Dd. Use instructional techniques to accommodate different skill levels among team members	3.81 .95	1 .7	11 8.2	36 26.9	51 38.1	35 26.1	134
De. Create opportunities for regular and frequent practice of teamwork skills	3.79 1.04	2 1.5	13 9.7	38 28.4	39 29.1	42 31.3	134
Df. Create opportunities for team members to accomplish simpler tasks before moving on to more complex tasks	3.77 1.00	1 .7	16 11.9	32 23.9	49 36.6	36 26.9	134
Dg. Encourage team members to reflect critically on their team experiences	3.87 .90		10 7.5	33 24.6	55 41.0	36 26.9	134
Dh. Provide situations for teams to learn from mistakes in a non-threatening environment	3.95 .944	1 .7	10 7.5	27 20.1	53 39.6	43 32.1	134
Di. Provide opportunities for team members to work through the whole team task	3.79 .91		11 8.3	39 29.3	50 37.6	33 24.8	133

APPENDIX G (Continued)

Dj. Provide feedback on important aspects of team performance	4.07 .81		6 4.5	21 15.7	63 47.4	43 32.3	133
Dk. Provide feedback to individual team members	3.64 .93		15 11.2	45 33.6	47 35.1	27 20.1	134
Dl. Prepare team members to accept constructive feedback from other team members	3.79 .97	1 .7	16 11.9	26 19.4	58 43.4	33 24.6	134
Dm. Prepare team members to give constructive feedback to other team members	3.87 .94	1 .7	13 9.7	24 17.9	61 45.5	35 26.1	134
E. Encourage continuous improvement							
Ea. Pilot test teamwork training before full-scale implementation	3.36 1.15	7 5.3	24 18.3	41 31.3	33 25.2	26 19.8	131
Eb. Use trainee feedback to modify training programs	4.33 .85		6 4.5	15 11.4	41 31.1	70 53.0	132
Ec. Tie evaluation measures to performance objectives	3.78 1.06	2 1.5	14 10.8	35 26.9	38 29.2	41 31.5	130
Ed. Provide opportunities for team members to rate their satisfaction with teamwork training activities	4.11 .98	1 .7	10 7.5	21 15.7	43 32.1	59 44.0	134
Ee. Evaluate the extent to which teamwork training results in changes in teamwork behavior	3.28 1.00	2 1.5	30 22.6	47 35.3	37 27.8	17 12.8	133
Ef. Evaluate the extent to which teamwork training activities result in improved team performance	3.47 1.04	3 2.2	23 17.1	45 33.6	39 29.1	24 17.9	134
Eg. Evaluate the extent to which the team meets its team goals	3.73 1.00	2 1.5	13 9.8	37 28.0	46 34.8	34 25.8	132
Eh. Evaluate the extent to which teamwork training activities relate to improved productivity	3.44 1.02	3 2.3	21 16.0	44 33.6	41 31.3	22 16.8	131
Ei. Evaluate individual team member's satisfaction with the team process	3.78 .99	1 .8	12 9.1	40 30.3	41 31.1	38 28.8	132
Ej. Evaluate the ability of the team to work together in the long-term	3.18 1.10	10 7.6	23 17.4	50 37.9	32 24.2	17 12.9	132

APPENDIX H

Mean Ratings, Frequencies and Percentages: Importance Measure

Item	*Mean* *SD*	frequency (percentage)					*n*
		1	2	3	4	5	
A. Analyze the teams' environment							
Aa. Define what constitutes a team within the organization	4.35 .82	1 .7	4 3.0	11 8.2	49 36.6	69 51.5	134
Ab. Use model(s) of team performance appropriate to the organization	4.21 .79	1 .8	2 1.5	18 13.7	58 44.3	52 39.7	131
Ac. Identify organizational factors which might impact teamwork	4.50 .58			6 4.5	55 41.0	73 54.5	134
Ad. Consider how the team's goals fit with overall organizational strategy	4.58 .66	1 .7	1 .7	4 3.0	41 30.6	87 64.9	134
Ae. Consider the impact of the organization's reward system on teamwork	4.15 .90	2 1.5	4 3.0	21 15.7	52 38.8	55 41.0	134
Af. Consider the impact of the organization's information system on teamwork	4.07 .88	2 1.5	3 2.2	26 19.4	55 41.0	48 35.8	134
Ag. Consider the resources the team has available to achieve its goal(s)	4.40 .67			14 10.4	53 39.6	67 50.0	134
Ah. Assess management's willingness to implement team recommendations	4.60 .61	1 .7		3 2.2	43 32.1	87 64.9	134
Ai. Identify other groups with which the team must interact to achieve its goal(s)	4.37 .69		1 .7	13 9.7	56 41.8	64 47.8	134
Aj. Involve team members in analyzingthe team situation	4.6 .64	1 .7		5 3.7	40 29.9	88 65.7	134
B. Analyze the team and its task							
Ba. Determine how the team's task affects team interaction	4.14 .72		2 1.5	20 15.2	68 51.5	42 31.8	132
Bb. Identify how technology might impact team processes	3.68 .75	1 .8	4 3.0	47 35.3	65 48.9	16 12.0	133
Bc. Determine the impact of workflow on teamwork	4.19 .71		1 .8	20 15.2	64 48.5	47 35.6	132
Bd. Identify the specific teamwork skills required by the team's task	4.39 .73	1 .8	2 1.5	7 5.3	57 42.9	66 49.6	133
Be. Assess the existing teamwork skills of individual team members	4.14 .72		3 2.2	17 12.7	72 53.7	42 31.3	134

APPENDIX H (Continued)

Bf. Identify team members' attitudes toward their team	4.22 .84	1 .7	4 3.0	17 12.7	54 40.3	58 43.3	134
Bg. Identify team members' expectations for teamwork training	4.22 .74		3 2.2	16 11.9	64 47.8	51 38.1	134
Bh. Clarify individual team members' responsibilities on the team	4.47 .66	1 .7		6 4.5	55 41.0	72 53.7	134
Bi. Consider the critical leadership behaviors appropriate for the team's goals	4.29 .73		1 .7	19 14.2	54 40.3	60 44.8	134
Bj. Consider how committed the team members are to the team as a unit	4.36 .64			12 9.0	62 46.3	60 44.8	134
Bk. Determine the specific communication behaviors which lead to effective team performance	4.42 .69		2 1.5	9 6.7	53 39.6	70 52.2	134
Bl. Determine how the team coordinates its work	3.95 .79	1 .8	4 3.0	26 19.7	70 53.0	31 23.5	132
Bm. Identify the team's problem solving strategies	4.42 .69	1 .8		9 6.8	55 41.4	68 51.1	133
Bn. Identify the team's decision-making processes	4.46 .68	1 .8		8 6.0	52 39.1	72 54.1	133
Bo. Identify the team's conflict management strategies	4.49 .62			9 6.8	50 37.6	74 55.6	133
C. Create complex and real-world teamwork training activities							
Ca. Prepare performance-based instructional objectives	4.11 .83	1 .8	3 2.3	24 18.2	56 42.4	48 36.4	132
Cb. Encourage all team members to participate in training	4.62 .67	1 .7	1 .7	5 3.7	34 25.3	93 69.4	134
Cc. Create customized training activities, based on real-life team problems	4.41 .72	1 .7		12 9.0	51 38.1	70 52.2	134
Cd. Provide opportunities for team members to clarify their team's goals	4.41 .76	1 .7		16 11.9	43 32.1	74 55.2	134
Ce. Provide opportunities to clarify each team member's responsibilities	4.25 .79	1 .8	2 1.5	16 12.2	56 42.7	56 42.7	131
Cf. Emphasize training on tasks that require team interaction	4.14 .76		1 .8	26 19.8	57 43.5	47 35.9	131
Cg. Provide opportunities for team members to get to know each other's interaction styles	4.30 .76	1 .8	2 1.5	12 9.0	59 44.4	59 44.4	133

APPENDIX H (Continued)

Ch. Provide activities to practice conflict management	4.14 .78		4 3.1	19 14.5	62 47.3	46 35.1	131
Ci. Provide activities with several different possible strategies for solution	4.01 .78	1 .8	3 2.3	24 18.2	69 52.3	35 26.5	132
Cj. Provide activities so that team members understand the need to ask for help when necessary	3.84 .88	1 .8	7 5.3	37 27.8	56 42.2	32 24.1	133
Ck. Ensure that all instructors/facilitators model effective communication behavior	4.52 .66	1 .7		6 4.5	48 35.8	79 59.0	134
Cl. Provide opportunities for follow-up training to ensure maintenance of skills	4.40 .69	1 .7		10 7.5	57 42.5	66 49.3	134
Cm. Identify ways to incorporate training into real-time work activities (just-in-time training)	4.31 .85	2 1.5	3 2.3	13 9.8	49 36.8	66 49.6	133
D. Consider the unique needs of adult learners							
Da. Pay attention to the social environment created by instructor/facilitator interaction with trainees	4.38 .71		1 .8	15 11.3	49 36.8	68 51.1	133
Db. Relate training activities to past experiences of team members	4.23 .78	1 .7	1 .7	20 14.9	56 41.8	56 41.8	134
Dc. Actively incorporate instructional techniques to accommodate different learning style preferences	4.35 .797	2 1.5	1 .7	12 9.0	52 38.8	67 50.0	134
Dd. Use instructional techniques to accommodate different skill levels among team members	4.27 .78	1 .7	1 .7	18 13.4	55 41.0	59 44.0	134
De. Create opportunities for regular and frequent practice of teamwork skills	4.38 .77	1 .7	1 .7	12 9.0	52 38.8	68 50.7	134
Df. Create opportunities for team members to accomplish simpler tasks before moving on to more complex tasks	4.13 .82	1 .7	6 4.5	13 9.7	68 50.7	46 34.3	134
Dg. Encourage team members to reflect critically on their team experiences	4.25 .68			18 13.4	64 47.8	52 38.8	134
Dh. Provide situations for teams to learn from mistakes in a non-threatening environment	4.43 .69		1 .7	12 9.0	49 36.6	72 53.7	134
Di. Provide opportunities for team members to work through the whole team task	4.26 .75		2 1.5	18 13.6	56 42.4	56 42.4	132

APPENDIX H (Continued)

Dj. Provide feedback on important aspects of team performance	4.43 .65	1 .8		6 4.5	60 45.1	66 49.6	133
Dk. Provide feedback to individual team members	4.14 .80	1 .7	2 1.5	22 16.4	61 45.5	48 35.8	134
Dl. Prepare team members to accept constructive feedback from other team members	4.43 .66	1 .7		10 7.5	53 39.6	70 52.2	134
Dm. Prepare team members to give constructive feedback to other team members	4.46 .67		2 1.5	7 5.2	52 38.8	73 54.5	134
E. Encourage continuous improvement							
Ea. Pilot test teamwork training before full-scale implementation	4.10 .83		2 4.6	21 16.0	58 44.3	46 35.1	131
Eb. Use trainee feedback to modify training programs	4.61 .63		1 .8	7 5.3	34 25.8	90 68.2	132
Ec. Tie evaluation measures to performance objectives	4.33 .81	1 .8	3 2.3	13 10.0	48 36.9	65 50.0	130
Ed. Provide opportunities for team members to rate their satisfaction with teamwork training activities	4.37 .77		3 2.2	15 11.2	46 34.3	70 52.2	134
Ee. Evaluate the extent to which teamwork training results in changes in teamwork behavior	4.26 .79	1 .8	44 3.0	10 7.5	62 46.6	56 42.1	133
Ef. Evaluate the extent to which teamwork training activites result in improved team performance	4.42 .69	1 .7	1 .7	6 4.5	58 43.3	68 50.7	134
Eg. Evaluate the extent to which the team meets its team goals	4.36 .78	2 1.5		13 9.8	51 38.6	66 50.0	132
Eh. Evaluate the extent to which teamwork training activities relate to improved productivity	4.30 .75	1 .8	1 .8	14 10.7	57 43.5	58 44.3	131
Ei. Evaluate individual team member's satisfaction with the team proces	4.28 .70		1 .8	16 12.0	61 45.9	55 41.4	133
Ej. Evaluate the ability to the team to work together in the long-term	4.03 .97	2 1.5	11 8.4	14 10.7	58 44.3	46 35.1	131

APPENDIX I

Ranks and Correlations: Frequency of Performance and Importance Measures

Item	Rank FP	Rank Imp	*r*
A. Analyze the team's environment			
Aa. Define what constitutes a team within the organization	20	30	.53
Ab. Use model(s) of team performance appropriate to the organization	33	45	.57
Ac. Identify organizational factors which might impact teamwork	6	7	.57
Ad. Consider how the team's goals fit with overall organizational strategy	5	5	.44
Ae. Consider the impact of the organization's reward system on teamwork	54	47	.47
Af. Consider the impact of the organization's information system on teamwork	52	56	.57
Ag. Consider the resources the team has available to achieve its goal(s)	12	21	.54
Ah. Assess management's willingness to implement team recommendations	10	3	.29
Ai. Identify other groups with which the team must interact to achieve its goal(s)	28	25	.61
Aj. Involve team members in analyzing the team situation	2	4	.54
B. Analyze the team and its task			
Ba. Determine how the team's task affects team interaction	43	52	.72
Bb. Identify how technology might impact team processes	60	61	.54
Bc. Determine the impact of work flow on teamwork	34	46	.62
Bd. Identify the specific teamwork skills required by the team's task	25	22	.55
Be. Assess the existing teamwork skills of individual team members	50	50	.63
Bf. Identify team members' attitudes toward their team	32	43	.63
Bg. Identify team members' expectations for teamwork training	26	44	.65
Bh. Clarify individual team members' responsibilities on the team	8	9	.60
Bi. Consider the critical leadership behaviors appropriate for the team's goals	29	35	.67
Bj. Consider how committed the team members are to the team as a unit	27	27	.59
Bk. Determine the specific communication behaviors which lead to effective team performance	19	16	.55
Bl. Determine how the team coordinates its work	48	59	.52
Bm. Identify the team's problem solving strategies	17	17	.46

APPENDIX I (Continued)

Bn. Identify the team's decision-making processes	13	11	.51
Bo. Identify the team's conflict management strategies	24	8	.51
C. Create complex and real-world teamwork training activities			
Ca. Prepare performance-based instructional objectives	46	54	.71
Cb. Encourage all team members to participate in training	1	1	.58
Cc. Create customized training activities, based on real-life team problems	16	18	.55
Cd. Provide opportunities for team members to clarify their team's goals	9	19	.63
Ce. Provide opportunities to clarify each team member's responsibilities	21	41	.60
Cf. Emphasize training on tasks that require team interaction	36	49	.76
Cg. Provide opportunities for team members to get to know each other's interaction styles	18	33	.64
Ch. Provide activities to practice conflict management	51	48	.62
Ci. Provide activities with several different possible strategies for solution	49	58	.58
Cj. Provide activities so that team members understand the need to ask for help when necessary	57	60	.56
Ck. Ensure that all instructors/facilitators model effective communication behavior	4	6	.56
Cl. Provide opportunities for follow-up training to ensure maintenance of skills	53	20	.32
Cm. Identify ways to incorporate training into real-time work activities (just-in-time training)	45	18	.53
D. Consider the unique needs of adult learners			
Da. Pay attention to the social environment created by instructor/facilitator interaction with trainees	7	23	.73
Db. Relate training activities to past experiences of team members	11	42	.52
Dc. Actively incorporate instructional techniques to accommodate different learning style preferences	22	29	.50
Dd. Use instructional techniques to accommodate different skill levels among team members	35	37	.54
De. Create opportunities for regular and frequent practice of teamwork skills	38	24	.49
Df. Create opportunities for team members to accomplish simpler tasks before moving on to more complex tasks	42	53	.62
Dg. Encourage team members to reflect critically on their team experiences	30	40	.65
Dh. Provide situations for teams to learn from mistakes in a non-threatening environment	23	13	.53
Di. Provide opportunities for team members to work through the whole team task	39	39	.66
Dj. Provide feedback on important aspects of team performance	15	14	.48

APPENDIX I (Continued)

Dk. Provide feedback to individual team members	47	51	.52
Dl. Prepare team members to accept constructive feedback from other team members	37	12	.49
Dm. Prepare team members to give constructive feedback to other team members	31	10	.52
E. Encourage continuous improvement			
Ea. Pilot test teamwork training before full-scale implementation	58	55	.58
Eb. Use trainee feedback to modify training programs	3	2	.61
Ec. Tie evaluation measures to performance objectives	40	31	.45
Ed. Provide opportunities for team members to rate their satisfaction with teamwork training activities	14	26	.62
Ee. Evaluate the extent to which teamwork training results in changes in teamwork behavior	59	38	.37
Ef. Evaluate the extent to which teamwork training activities result in improved team performance	56	15	.30
Eg. Evaluate the extent to which the team meets its team goals	44	28	.45
Eh. Evaluate the extent to which teamwork training activities relate to improved productivity	55	34	.33
Ei. Evaluate individual team member's satisfaction with the team process	41	36	.54
Ej. Evaluate the ability of the team to work together in the long-term	61	57	.41

APPENDIX J

Factor Loadings and Scale Reliabilities: Frequency of Performance

Items	Factor Loadings		
Factors	**A1**	**A2**	
Ad. Consider how the team's goals fit with overall organizational strategy	**.65**	.32	
Ae. Consider the impact of the organization's reward system on teamwork	**.70**	-.03	
Af. Consider the impact of the organization's information system on teamwork	**.63**	.10	
Ag. Consider the resources the team has available to achieve its goal(s)	**.72**	.10	
Ah. Assess management's willingness to implement team recommendations	**.66**	.26	
Ai. Identify other groups with which the team must interact to achieve its goal(s)	**.50**	.37	
Aa. Define what constitutes a team within the organization	.11	**.64**	
Ab. Use model(s) of team performance appropriate to the organization	-.05	**.81**	
Ac. Identify organizational factors which might impact teamwork	.41	**.47**	
Aj. Involve team members in analyzing the team situation	.27	**.59**	
Eigen values Percentage of total variance explained	3.49 27.68	1.24 19.59	
Cronbach's alpha	.76	.61	
Factors	**B1**	**B2**	**B3**
Bi. Consider the critical leadership behaviors appropriate for the team's goals	**.49**	.17	.31
Bk. Determine the specific communication behaviors which lead to effective team performance	**.55**	.05	.33
Bm. Identify the team's problem solving strategies	**.86**	.26	.01
Bn. Identify the team's decision-making processes	**.82**	.30	.07
Bo. Identify the team's conflict management strategies	**.85**	.12	.16
Ba. Determine how the team's task affects team interaction	.33	**.60**	.28
Bb. Identify how technology might impact team processes	-.04	**.76**	.04
Bc. Determine the impact of work flow on teamwork	.21	**.72**	-.05
Bh. Clarify individual team members' responsibilities on the team	.17	**.55**	.37
Bl. Determine how the team coordinates its work	.36	**.60**	.12
Bd. Identify the specific teamwork skills required by the team's task	.06	**.51**	**.51**

APPENDIX J (Continued)

Be. Assess the existing teamwork skills of individual team members	.00	.15	**.78**
Bf. Identify team members' attitudes toward their team	.20	.03	**.82**
Bg. Identify team members' expectations for teamwork training	.45	-.05	**.52**
Bj. Consider how committed the team members are to the team as a unit	.30	.26	**.52**
Eigenvalue Percentage of variance explained	5.40 22.19	1.56 17.82	1.55 16.83
Cronbach's alpha	.83	.78	.76
Factors	**C1**	**C2**	
Ca. Prepare performance-based instructional objectives	**.73**	.00	
Cb. Encourage all team members to participate in training	**.61**	.20	
Cc. Create customized training activities, based on real-life team problems	**.75**	.09	
Cd. Provide opportunities for team members to clarify their team's goals	**.56**	.48	
Ce. Provide opportunities to clarify each team member's responsibilities	**.47**	.40	
Cf. Emphasize training on tasks that require team interaction	**.47**	.34	
Ch. Provide activities to practice conflict management	**.55**	.38	
Ci. Provide activities with several different possible strategies for solution	**.60**	.45	
Ck. Ensure that all instructors/facilitators model effective communication behavior	**.53**	.36	
Cg. Provide opportunities for team members to get to know each other's interaction styles	.47	**.50**	
Cj. Provide activities so that team members understand the need to ask for help when necessary	.27	**.73**	
Cl. Provide opportunities for follow-up training to ensure maintenance of skills	.12	**.78**	
Cm. Identify ways to incorporate training into real-time work activities (just-in-time training)	.11	**.70**	
Eigenvalues Percentage of variance explained	5.29 26.80	1.10 22.33	
Cronbach's alpha	.84	.73	
Factors	**D1**	**D2**	
Da. Pay attention to the social environment created by instructor/facilitator interaction with trainees	**.74**	.12	
Db. Relate training activities to past experiences of team members	**.68**	.01	
Dc. Actively incorporate instructional techniques to accommodate different learning style preferences	**.80**	.16	

APPENDIX J (Continued)

Dd. Use instructional techniques to accommodate different skill levels among team members	**.71**	.31	
De. Create opportunities for regular and frequent practice of teamwork skills	**.58**	.37	
Df. Create opportunities for team members to accomplish simpler tasks before moving on to more complex tasks	**.55**	.44	
Dg. Encourage team members to reflect critically on their team experiences	**.60**	.44	
Di. Provide opportunities for team members to work through the whole team task	**.48**	.47	
Dh. Provide situations for teams to learn from mistakes in a non-threatening environment	.48	**.62**	
Dj. Provide feedback on important aspects of team performance	.23	**.66**	
Dk. Provide feedback to individual team members	.15	**.72**	
Dl. Prepare team members to accept constructive feedback from other team members	.13	**.85**	
Dm. Prepare team members to give constructive feedback to other team members	.15	**.85**	
Eigenvalues Percentage of variance explained	5.87 28.62	1.5 28.09	
Cronbach's alpha	.86	.84	
Factors	**E1**	**E2**	
Ee. Evaluate the extent to which teamwork training results in changes in teamwork behavior	**.70**	.42	
Ef. Evaluate the extent to which teamwork training activities result in improved team performance	**.79**	.40	
Eg. Evaluate the extent to which the team meets its team goals	**.75**	.03	
Eh. Evaluate the extent to which teamwork training activities relate to improved productivity	**.89**	.11	
Ej. Evaluate the ability of the team to work together in the long-term	**.68**	.31	
Ea. Pilot test teamwork training before full-scale implementation	.35	**.64**	
Eb. Use trainee feedback to modify training programs	.15	**.76**	
Ec. Tie evaluation measures to performance objectives	.43	**.50**	
Ed. Provide opportunities for team members to rate their satisfaction with teamwork training activities	-.01	**.80**	
Ei. Evaluate individual team member's satisfaction with the team process	.34	**.62**	
Eigenvalues Percentage of total variance explained	4.78 33.80	1.30 27.02	
Cronbach's alpha	.76	.87	

APPENDIX K

Correlations between Frequency of Performance Items and Critical Design Factor Scales

	Factors										
Item	A1	A2	B1	B2	B3	C1	C2	D1	D2	E1	E2
Aa	.28	**.67**	.27	.26	.16	.42	.24	.39	.30	.31	.13
Ab	.21	**.71**	.32	.31	.21	.42	.28	.32	.33	.25	.17
Ac	.41	**.67**	.30	.35	.36	.34	.26	.29	.21	.24	.21
Ad	**.71**	.40	.35	.49	.26	.45	.33	.33	.33	.34	.28
Ae	**.65**	.24	.39	.35	.33	.35	.48	.33	.37	.32	.40
Af	**.67**	.26	.24	.45	.33	.31	.39	.30	.38	.29	.37
Ag	**.61**	.30	.33	.48	.29	.25	.23	.28	.18	.29	.25
Ah	**.73**	.33	.31	.44	.34	.29	.26	.31	.36	.27	.24
Ai	**.65**	.35	.29	.49	.38	.32	.31	.32	.23	.26	.21
Aj	.37	**.67**	.42	.45	.36	.56	.42	.45	.40	.40	.17
Ba	.46	.59	.46	**.74**	.46	.53	.39	.43	.43	.43	.24
Bb	.46	.25	.18	**.66**	.21	.23	.34	.31	.19	.28	.23
Bc	.47	.30	.33	**.69**	.24	.32	.22	.26	.22	.31	.24
Bd	.37	.33	.32	**.68**	.65	.25	.33	.21	.26	.34	.32
Be	.26	.21	.25	.35	**.74**	.17	.22	.18	.17	.26	.25
Bf	.25	.25	.35	.31	**.82**	.29	.31	.25	.29	.26	.24
Bg	.24	.37	.42	.26	**.64**	.53	.43	.38	.40	.49	.26
Bh	.49	.30	.35	**.68**	.45	.39	.36	.21	.27	.30	.36
Bi	.28	.44	**.66**	.36	.39	.41	.33	.32	.33	.31	.28
Bj	.41	.31	.42	.44	**.65**	.41	.36	.30	.34	.25	.30
Bk	.24	.40	**.70**	.31	.39	.33	.20	.30	.36	.22	.16
Bl	.43	.37	.47	**.69**	.35	.37	.36	.31	.25	.23	.32
Bm	.42	.37	**.83**	.45	.35	.57	.35	.36	.37	.43	.29
Bn	.41	.38	**.82**	.49	.40	.61	.38	.47	.38	.47	.29
Bo	.38	.44	**.87**	.39	.41	.56	.40	.36	.44	.46	.37
Ca	.23	.47	.42	.30	.28	**.64**	.31	.42	.41	.45	.37
Cb	.15	.40	.29	.22	.30	**.62**	.37	.41	.39	.36	.27
Cc	.27	.38	.39	.27	.25	**.70**	.35	.52	.37	.42	.21
Cd	.46	.52	.48	.50	.43	**.73**	.54	.56	.45	.49	.32
Ce	.47	.40	.52	.52	.49	**.62**	.46	.44	.44	.40	.48
Cf	.30	.41	.40	.38	.27	**.60**	.42	.50	.41	.47	.33
Cg	.36	.29	.44	.37	.39	.58	**.72**	.51	.40	.46	.27

APPENDIX K (Continued)

Item	A1	A2	B 1	B2	B3	C1	C2	D1	D2	E1	E2
Ch	.39	.45	.54	.44	.43	**.68**	.49	.56	.64	.55	.38
Ci	.39	.42	.50	.38	.39	**.74**	.58	.57	.40	.50	.39
Cj	.46	.41	.33	.41	.32	.54	**.78**	.49	.51	.49	.50
Ck	.21	.42	.41	.24	.32	**.64**	.50	.48	.35	.44	.23
Cl	.43	.35	.32	.42	.45	.45	**.77**	.46	.52	.53	.63
Cm	.24	.25	.26	.39	.29	.42	**.69**	.40	.32	.33	.25
Da	.25	.34	.30	.22	.32	.51	.33	**.69**	.37	.44	.16
Db	.21	.32	.31	.20	.21	.38	.26	**.57**	.27	.28	.16
Dc	.30	.33	.25	.16	.17	.56	.38	**.77**	.40	.47	.34
Dd	.32	.35	.30	.28	.31	.53	.52	**.77**	.49	.47	.36
De	.35	.37	.35	.38	.32	.53	.54	**.72**	.47	.40	.29
Df	.39	.42	.43	.38	.36	.62	.49	**.72**	.52	.40	.27
Dg	.36	.43	.48	.33	.36	.56	.50	**.74**	.55	.47	.26
Dh	.42	.43	.45	.31	.29	.58	.53	.67	**.75**	.46	.36
Di	.43	.40	.28	.44	.32	.49	.48	**.67**	.52	.44	.35
Dj	.40	.40	.41	.39	.36	.42	.44	.47	**.70**	.33	.30
Dk	.35	.20	.29	.33	.35	.37	.38	.42	**.76**	.37	.48
Dl	.32	.37	.45	.25	.33	.57	.50	.47	**.86**	.55	.46
Dm	.32	.41	.45	.34	.38	.60	.52	.49	**.85**	.58	.45
Ea	.25	.23	.37	.25	.30	.46	.43	.43	.33	**.76**	.50
Eb	.20	.31	.33	.22	.26	.50	.44	.59	.40	**.75**	.38
Ec	.46	.34	.31	.48	.29	.45	.46	.40	.38	**.69**	.51
Ed	.32	.41	.27	.31	.29	.55	.38	.47	.52	**.69**	.28
Ee	.39	.30	.45	.43	.40	.49	.52	.40	.45	.57	**.82**
Ef	.44	.31	.41	.47	.41	.51	.50	.39	.47	.62	**.89**
Eg	.31	.14	.19	.30	.24	.27	.30	.22	.36	.36	**.70**
Eh	.28	.15	.35	.34	.31	.32	.38	.23	.37	.44	**.86**
Ei	.26	.35	.43	.34	.47	.52	.49	.43	.52	**.71**	.51

Highest correlations indicated by boldface type.