THESIS

THIRD GENERATION TRAINING: AN EMPERICAL INVESTIGATION

Submitted by

Tristan Nelson

Department of Psychology

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Fall 2012

Master's Committee:

Advisor: Kurt Kraiger

Alyssa Gibbons
Anne Cleary
Chris Henle

ABSTRACT

THIRD GENERATION TRAINING: AN EMPERICAL INVESTIGATION

Kraiger (2008b) outlined the differences between first, second, and third generation approaches to training design, and described the potential benefits of a third generation approach. The present study extends this work by further defining the components of a third generation approach and comparing it to a first generation approach using three commonly examined dependent variables: recall, near transfer, and far transfer. Results show no significant differences in trainee performance for participants in either the first or third generation training condition.

Keywords: third generation, training, social constructivism, training design, collaborative learning

DEDICATION

I would like to dedicate this thesis to the individuals who encouraged me and ultimately made this accomplishment possible. First, I would like to thank Dr. Kurt Kraiger for his insightful comments and suggestions and for his expert guidance throughout the entire project. Second, I would like to thank Dr. Alyssa Gibbons for her willingness to answer all of my crazy questions no matter how many times I asked them. Finally, I would like to thank my wife, Chailyn, for her patience with me in completing my thesis, for taking care of our son while I worked on it, and for all the materials she proofread and all of the presentations she listened to.

TABLE OF CONTENTS

INTRODUCTION

Training is "the formal procedures that a company utilizes to facilitate learning so that the resultant behavior contributes to the attainment of the company's goals and objectives" (McGehee & Thayer, 1961). In turn, learning can be thought of as "the systematic acquisition of skills, rules, concepts, or attitudes that result in improved performance" (Goldstein & Ford, 2002). The approaches to training and development have been conceptualized in a number of different ways throughout the years; often in tandem with our evolving understanding of what it means to learn (Kraiger & Ford, 2006). For example, some dominant approaches to training such as stimulus-response based methods popularized in the 1950's were influenced by the classical and operant-conditioning learning models proposed by prominent psychologists including Thorndike, Watson, and Skinner. Likewise, behavioral modeling approaches to training, first proposed by Goldstein and Sorcher (1974), were influenced by Bandura's (1977, 1982) social cognitive theory. These examples support an assertion made by Kraiger (2008b) that popular methods for training are heavily based on what we understand learning to be. In this article, Kraiger also argued that we are on the verge of another shift in our understanding of what learning is and how it can be facilitated.

To elaborate, Kraiger (2008b) distinguished among what he refers to as first, second and third generation approaches to training design. First generation approaches to training design are those in which the learner holds a passive role, with the responsibility of absorbing information that others have deemed important. Fundamentally, first generation approaches can be thought of as those that identify a single best way of performing particular tasks, place the primary responsibility for learning on the instructor, and define training success as when the trainee can replicate some criterion behavior (Kraiger, 2008b). First generation approaches are also referred

to as objectivist approaches since knowledge is assumed to be objective and there is an emphasis placed on the importance of determining specific behavioral objectives (Mager, 1962).

In contrast to first generation approaches to training design, second generation approaches are those in which knowledge is conceptualized as individually constructed. Second generation training design models can be thought of as those that emphasize the importance of the active involvement of the learner in choosing their learning objectives, choosing their own learning methods, organizing their new found knowledge, and deciding how to act upon that new knowledge. Implicit in second generation training design models is the assumption that not all trainees should learn the same content. Instead learners construct knowledge based on personal needs and interests (Kraiger, 2008b). Second generation approaches to training design are also referred to by Kraiger as constructivist approaches. This label connotes that learners actively "construct" models of task-relevant knowledge and skills, and indicates that this approach to training has its roots in constructivist theories of learning (Bruner, 1990).

Third generation approaches to training design are distinguished from the first two in several ways. First, they consider knowledge to be socially constructed (in addition to being individually constructed). That is, third generation approaches, like second generation approaches, place an emphasis on individuals constructing knowledge based on specific needs and interests (Kraiger, 2008b). However, the third generation approach states that much of this knowledge is the result of social interactions or social negotiations of meaning (Kraiger, 2008a). Accordingly, the locus of knowledge is not in the individual. Instead, learning and understanding are believed to be inherently social; and cultural activities and tools are seen as essential to knowledge development (Palinscar, 1998). Stated another way, a third generation approach rejects the notion that there is one objective knowledge domain or an objective set of skills and

competencies that must be learned and contends that knowledge is constructed individually and through a continuous process of social negotiation of meaning.

A second way in which a third generation approach differs from the first two is its purpose. While training can and should result in the acquisition of job related knowledge, skills, and abilities, another key purpose of third generation instruction is to enhance individuals' social learning skills and enable them to continue learning while on the job through everyday interactions with others. Such a contention does not suppose that we cannot or do not acquire knowledge that is objectively true or personally meaningful. For example, it is objectively true that the sixteenth president of the United States was Abraham Lincoln, and the fact that the author's favorite flavor of ice cream is chocolate is personally meaningful. However, a great deal of the knowledge required to competently fill one's position at work is socially negotiated. For example, if a manager hopes to effectively delegate a task to a subordinate there must be a common understanding of the manager's authority, what is involved in the task, and what criteria will be used to determine when the task is complete or if it has been completed satisfactorily. Third generation, or social constructivist, approaches to training assume that the goal of training is to create an interactive learning environment in which trainees learn from interactions with the instructor and their fellow trainees and the trainer learns from interactions with trainees as well (Kraiger, 2008b; Moore 1989).

There are a number of potential benefits to using a third generation approach to training design. First, a third generation training design approach should result in deeper mental processing and better learning. For example, think-alouds (a process of describing one's thoughts, actions, and feelings out loud during some task) have been described as an important instructional method, characteristic of a third generation design approach (Kraiger, 2008b).

Think-alouds have been shown to be an extremely effective approach to communicating effective problem solving strategies to less experienced individuals (Duffy et al., 1986). Additionally, Scardamalia and Bereiter (1989) demonstrated that explaining one's thinking to another aloud can result in deeper processing of information for that individual. Second, a third generation approach to training design should result in improved transfer of skills to the workplace. Indeed, research shows that the social context can have a powerful effect on training transfer (Aguinis & Kraiger, 2009). If a trainee is able to gain experience in the social negotiation of understanding to complete training tasks, it is possible that the employee will also exhibit improved transfer of trained skills to the workplace. For example, a manager who has recently attended a third generation leadership training - in which delegation skills are learned through social negotiation - may be more likely to successfully transfer his or her delegation skills to the workplace. This is because the manager acquired negotiation skills such that he/she is able to negotiate the meaning of delegation with his/her subordinates and then successfully transfer the delegation skills learned during training.

Finally, research suggests that a third generation training approach should result in increased motivation to learn and motivation to persist during struggles to apply learning to new tasks. For example, Sharan and Shaulov (1990) investigated the effect of cooperative learning on the intrinsic motivation, task perseverance, and assumed personal responsibility of learners. Their results indicated that learners in cooperative learning conditions are likely to display higher levels of intrinsic motivation, task perseverance and increased ownership or personal responsibility for learning goal achievement than their control group counterparts. Furthermore, Nichols (1996) demonstrated that high-school geometry students in cooperative learning groups exhibited higher performance, greater efficacy, higher levels of intrinsic valuing of geometry,

stronger learning goal orientations, and greater use of deep processing strategies than their control-group peers. In both these studies, social interaction and the collaborative negotiation of knowledge, characteristics of the third generation approach to training design, were key components to improved learning and transfer.

Although there is some evidence that specific components of the third generation approach to training design can result in improved learning outcomes, there is no empirical evidence to indicate that third generation training design, as a whole, results in such outcomes. Thus, the purpose of the present study is to help operationally define the third generation approach to training design and explore the difference in learning outcomes for individuals in a third generation type training verses a first generation type training.

First Generation Approach to Training Design

At this point it is beneficial to outline and illustrate the differences between the first and third generation approaches to training design. By doing so, I hope to clarify how the third generation approach differs from traditional training design approaches in terms of their instructional methods and major assumptions. I will begin by outlining the first generation approach to training design.

A common example of a first generation approach to training design would be typical computer-based training or intelligent tutoring methods of instruction. Intelligent tutoring systems (ITSs) can be defined as any computer based instructional system that works to emulate the benefits of one-on-one tutoring through providing direct and customized instruction or feedback to students without the intervention of human beings (Psotka & Sharon, 1988). ITSs embody many of the design principles inherent in the first generation approaches to training

design. For example, ITSs seek to provide trainees with objective understanding, that is, all learners are to master the same declarative knowledge or procedural skills.

To illustrate, consider an ITS designed to teach a child how to add fractions. Such a system would begin with some basic problem in which the child is encouraged to first convert both the fractions individually, and then add them together, and finally simplify to get the answer ("CTAT," n.d.). At each step (conversion, addition, and simplification), the child has the opportunity to enter the numbers they think are correct. When an incorrect number is entered, that number immediately turns red, alerting the child that they have made an unacceptable response. When a correct number is entered, that number immediately turns blue, letting the child know that they responded correctly. If the child is having difficulty entering the correct number at any point, they have the option of receiving a hint. If they are still struggling, more hints are offered until the answer and explanation are finally given to the student ("CTAT," n.d.). As demonstrated in this example, ITSs seek to provide learners with a highly structured environment in which tasks become easier or more difficult depending on one's ability. Additionally, such systems rely heavily on the presentation of immediate feedback to guide learners through each step of the learning task.

ITSs have become increasingly sophisticated over the years and have been employed in the instruction of content much more complex than simple fraction manipulations. Koedinger, Anderson, Hadley, and Mark (1997) demonstrated the usefulness of an intelligent tutoring system in the instruction of algebra to urban high school students. In their article, Koedinger et al. described the various components of their system. After reading a story problem, students are encouraged to identify the important facts by filling in a table with the various numbers pertinent

to solving the problem. Once these numbers have been identified, the student can then choose and enter algebraic equations to answer a number of questions posed in the story problem.

Another example of a more sophisticated ITS was provided by Crowley and Medvedeva (2006). They described the process of designing an ITS known as "SlideTutor" that was designed to train medical personnel on visual classification problem solving. In many areas of medical practice (e.g. radiology, hematology, pathology) the correct classification of visual stimuli it is critically important (e.g. being able to correctly classify a patient's tissue sample as exhibiting inflammatory skin disease). SlideTutor was designed to effectively train medical personnel to correctly classify various conditions. First, the learner is presented with a brief clinical history of the patient including information such as age race etc. Next, the learner is presented with a multifunction screen in which hints can be solicited, the slide can be navigated, abnormalities can be marked and labeled, reasoning can be diagramed and hypotheses can be offered. Each step in the learners' reasoning process is diagramed and immediate feedback is provided. If their reasoning is correct, the system accepts their answer. If an incorrect response is made then they are provided with some explanation. Throughout the process, the learner has the option of hypothesizing possible diagnoses. When the learner has identified all relevant conditions in the slide and has a number of hypotheses they can then enter and propose all relevant diagnoses.

The above examples of ITSs illustrate multiple assumptions of first generation training design approaches. First, an objectivist or first generation approach to training design emphasizes the objectivity of knowledge. With ITSs there is one objectively correct concept that trainees are meant to learn. In the examples given above, learners were expected to enter the correct numbers or identify the correct diagnosable features on the slide. If any response was provided that had

not been programmed into the tutoring system, the trainee was immediately informed that the response was incorrect.

Second, these examples illustrate the first generation's emphasis on the passive role of trainees in selecting, acting upon and organizing new knowledge. Instead of being active participants constructing their own knowledge, trainees in ITSs are responsible only for mastering the information presented to them. For example, students using the algebra tutor were presented with, and expected to follow, a predefined and highly structured sequence of tutoring. In this case the training or program designers had complete control over what information was presented, how it was acted upon during the training and how it would be organized.

Third, the first generation training design approaches emphasize the central role of the organization and/or trainer. In other words, it is the primary responsibility of the organization and the trainer to correct skill or knowledge deficits among employees. Trainers (or the developers of ITSs) have the responsibility of defining training content, eliciting performance and reinforcing correct performance. In fact, trainees in first generation approaches merely need to pay attention to the training content (Gagné, Briggs, & Wagner 1992) and follow the prompts. Fourth, the first generation approaches to training design are built on behavioral learning principles. In fact, the design principles and even the general concept of ITSs closely resemble those used by Skinner (1960) in the design and implementation of his teaching machines. The intelligent tutor examples described above exemplify this through their use of clearly defined instructional objectives, reinforcement, successive approximations of desired behaviors, and immediate feedback. Fifth, first generation training design approaches provide trainees with very little control over the topics explored, the media through which material is presented, or the pace of training (although some ITSs may provide considerable control over the pace). This is

exemplified by the algebra tutoring system described above. Students working with this system were presented with particular topics on specified days and interacted with the material through only one medium (the tutoring program). Sixth and finally, a first generation approach to training design generally involves very little collaboration with other trainees. ITSs are an extreme example of the relative isolation that accompanies the first generation approaches. In each of the above examples, learners interacted only with the material and could have completed the entire training without ever speaking to or interacting with another individual.

Third Generation Approach to Training Design

Now that the first generation approach to training design has been outlined and examples have been provided, I will discuss the third generation approach and its inherent assumptions. This should provide the reader with a better understanding of the fundamental differences between more traditional training design approaches and a third generation or social constructivist approach to training design.

First, in contrast to the first generation approaches, a third generation approach to training design does not conceptualize knowledge as objective; the third generation or social constructivist perspective assumes knowledge is socially constructed. This means that according to a social constructivist perspective, the world is understood through social artifacts which are products of historically-situated interchanges among people (Gergen, 1985). For example, the concept of leader might differ across time, situation, or social composition. To one person or group of individuals a strong leader might be an individual that provides step-by-step guidance on a task and empathy for the challenges faced in the workplace. For another person or group of individuals, a leader might be someone who seeks to provide needed resources and allows his or her subordinates to function autonomously. A learner participating in a leadership development

training based on third generation design principles, will interact with fellow trainees and with the training instructor to successfully negotiate what it means to be a leader. When the leader returns to the workplace he/she is able to effectively negotiate the meaning of leadership with his/her subordinates because of the negotiation skills acquired during training.

Second, rather than assigning a passive role to trainees, a third generation approach considers the trainee to be an active participant in the construction of training-related knowledge. This is because the trainee is expected to contribute to the social process in which he or she learns from other trainees and from the instructor, but also because the instructor and other trainees also learn from these interactions. In other words, the trainee is expected to participate and contribute to the learning of others, not simply process the information presented.

Third, rather than being solely instructor-centered, a social constructivist approach to training design shares responsibility for the acquisition of necessary skills and abilities among trainees, the organization and the instructor. Fourth, a third generation approach to training design is not rooted in behavioral learning principles and highly structured sequenced training, but seeks to inspire trainees to explore and make sense of training material. In other words, trainees are encouraged to decide how to best navigate training content and to discover the meaning and appropriate applications of training knowledge, through their social interactions with fellow trainees (Kraiger, 2008b). Fifth, a social constructivist approach to training design allows trainees much more control over the topics explored, the media through which material is presented and the pace of training. Finally, a third generation approach to training design places an emphasis on the importance of trainees interacting not only with the training material but also with the trainer and with fellow trainees.

Instructional Methods Characteristic of the Third Generation Approach

Now that the differences between the first and third generation approaches to training design have been explained and some of the major assumptions have been outlined, I turn to a discussion of the fundamental instructional methods that are characteristic of the third generation approach to training design. Although each of the following methods is characteristic of a social constructivist or third generation approach, it is not necessary for all of the methods to be simultaneously present for the training is to be considered 'third generation'.

Kraiger (2008b) outlined a number of instructional methods that are characteristic of the third generation approach to training design. These include adaptive guidance, collaborative learning, think-aloud/protocol analysis, social skills development, negotiation of meaning, reflection, and flattening of power. Each of these is discussed below to clarify their respective roles in and importance to the third generation approach.

Adaptive guidance. In the third generation approach to training design, trainees have greater control over their training experience in the form of adaptive guidance. Adaptive guidance is defined by Bell and Koslowski (2002) as a "training strategy that provides trainees with diagnostic and interpretive information that helps them make effective learning decisions (p. 268)." Adaptive guidance involves more than simply giving learners control over their learning experience; it involves providing learners with the information to make the best learning decisions.

Adaptive guidance is different than, though related to, the notion of learner control. Learner control is defined as the extent to which a learner can affect his or her own learning experience through control over features in his or her learning environment such as the path, pace, or contingencies of instruction (Friend & Cole, 1990). In other words, control involves

allowing learners to determine what material is presented, in what order the material is presented, and how fast or slow they move through the material. Kraiger and Jerden (2007) described a number of potential positive outcomes associated with learner control including the development of effective learning strategies, a desire to explore the training topic in greater detail, greater intrinsic motivation, and more learning. However, there are a number of studies that present findings contrary to those just described, and Kraiger and Jerden's meta-analysis found only mild support for the use of learner control on instructional outcomes. Additionally, there may be a number of drawbacks to simply increasing learner control in a training situation. For example, research suggests that trainees may not always make the best choices regarding their training experience (DeRouin, Fritzsche, & Salas, 2004). In fact extremely high levels of control have been shown to result in less time spent on training tasks and the development of poor learning strategies (Brown, 2001). Specifically, Brown demonstrated that when given total control, trainees tend to skip over sections that are critical to their understanding of the material and may move through the training too quickly.

Adaptive guidance provides a desirable alternative to high learner control. Adaptive guidance is designed to provide trainees with information about the best way to proceed with the training material (Bell & Kozlowski, 2002). After receiving guidance, learners can then decide how, or whether to use the information they have been given. This added sense of control, along with guidance regarding material that may need more attention, results in improved learning outcomes including better performance and improved transfer especially for more complex training topics (Bell & Kozlowski, 2002).

To illustrate how adaptive guidance might function, consider a group of trainees completing a third generation style data management training course. In this course, employees

would work in groups deciding what material should be explored. Perhaps most of the group members are familiar with the basic data management information but cannot remember how to recover lost data. In this case, the group would be free to explore the recovery section of the training material. Additionally, the group would be permitted to decide how much time to spend on this section of the material before moving on. During the process, the trainer would monitor learner progress and provide feedback and suggestions for areas of improvement. Thus the group of trainees maintains control over their learning experience but receives valuable feedback and guidance allowing them to make more effective learning decisions.

Other recent studies provide support for the use of adaptive guidance. Corbalan, Kester, and Van Merriënboer (2008) used a sample of 55first-year trainees in a Dutch vocational education and training program to study the impact of total learner control versus what they termed "shared control." In their study, shared control is analogous to adaptive guidance in that the computer program being used made suggestions for subsequent learning tasks. Specifically, when a trainee completed a task, their ability level was calculated and a number of tasks, customized to the learner's ability level, were then presented as options to choose from. Thus, the computer training program guided each trainee's learning but allowed some control over which actual tasks to select. Results indicated that participants in the shared learning condition experienced higher levels of motivation and task involvement than their total control counterparts. These findings suggest that trainees in adaptive guidance conditions are likely to increase the amount of effort invested in learning (Corbalan et al., 2008). Another study by Corbalan, Kester, and Van Merriënboer (2006) found that participants in the shared control condition achieved higher mean performance scores compared to those in the "total control"

group. Both of these studies seem to lend support to Bell and Kozlowski's (2002) assertions that adaptive guidance can help improve important training outcomes.

Kraiger (2008b) suggested that adaptive guidance should be viewed as an important instructional method characteristic of the third generation approach to training design. While first generation training design would not likely incorporate learner control, second generation training design would take more of a "total-control" approach. Alternatively, a third generation approach would emphasize the importance of adaptive guidance provided by both the training instructor and fellow trainees. In other words, learners participating in training based on third generation design principles would be given a high level of control that would be balanced with active guidance from the training instructor and other learners. This means that the responsibility for defining important concepts, determining individual needs and tracking progress would be distributed across training groups and training instructors such that the common problems associated with total-control would be minimized.

Collaborative learning. In the third generation approach to training design, trainees work collaboratively to learn the material presented to them. Collaborative learning can be defined as "an approach to learning in which a group of learners seeks to learn something together and in which the group depends on the joint efforts of each member to do so" (Barkley, Cross, & Major, 2005, pp. 4-5). Thus collaborative learning is a natural consequence of a social constructivist or third generation approach to training design.

Smith (1996) outlined five common elements of collaborative learning: positive interdependence, promotive interaction, individual and group accountability, development of teamwork skills, and group processing (p. 74-76). To illustrate these elements, consider the data management training described above. In this training, the success of individual trainees would

be related to the overall success of the group (positive interdependence). The trainees would also be expected to interact with and help each other learn (promotive interaction). Those in the training would be held accountable for both their contribution to the group and their group's performance (individual and group accountability). They would be taught and encouraged to use interpersonal and small group skills (development of teamwork skills) and would learn to evaluate their group's productivity throughout the training (group processing).

Barkley et al. (2005) explained that research has consistently demonstrated that collaborative learning techniques result in higher performance among learners than traditional competitive learning approaches. Although the majority of this research has focused on children grades K-12, a number of researchers have worked to examine the impact of collaborative learning among adults. Panitz (2001) reviewed and summarized multiple studies indicating benefits of collaborative learning. These include academic benefits such as improved critical thinking skills, increased participation in learning activities and improved classroom results such as higher academic achievement and increased class attendance. Collaborative learning can also result in social benefits including the development of social support systems, improvements in diversity understanding and even developments in behavior modeling and cooperation. Finally, collaborative learning can result in psychological benefits including higher self-esteem and increased positive attitudes towards instructors (Panitz, 2001; Roberts, 2005).

Related findings have been reported by Alavi (1994), who demonstrated the positive effects of computer-supported collaborative learning. In this study, 127 MBA students, enrolled in management information systems courses, experienced either a classic learning environment which included lectures and slides or a collaborative learning environment that included the use of a computer program designed to enhance collaborative learning experiences. Results from this

study showed that students in the collaborative learning environment performed better on the course final exam and reported higher levels of perceived skill development, self-reported learning, and learning interest. Additionally, learners in the collaborative condition reported a greater proportion of positive class evaluations than those in the traditional learning environment. Furthermore, Phillips, Santoro and Kuehn (1988) demonstrated that sometimes computer-supported collaborative learning environments can actually be more effective than face-to-face collaborative learning environments. In this study, the researchers sought to implement a group performance skills (GPS) training, among a large undergraduate class. Phillips et al. found that they were unable to facilitate effective collaborative interaction among trainees and resorted to computer based techniques to manage the problem. Interestingly, this switch resulted in higher performance in group behaviors than was attainable in the face-to-face classroom situation. Because of the amount of contact required between each group and the instructor, the researchers found computer-mediation to be a more effective method for training delivery. The reason being, that in a face-to-face training situation, all other groups would have to wait as the instructor provided feedback and instruction to each group in turn. In a computer-mediated condition however, trainees could receive feedback and personalized instruction without ever having to wait on other groups. Additionally, the researchers contended that trainees were more likely to ask questions and get answers in the computer-mediated condition than in a face to face GPS training.

The previously discussed research provides support for the effectiveness of collaborative learning as an important instructional method characteristic of the third generation approach to training design. Stacy (1999) explained that the process of collaborative learning occurs through group interactions and the development of a group consensus of knowledge. In other words,

collaborative learning is a natural component of social constructivism and the third generation approach to training design.

Think-aloud/protocol analysis. In the third generation approach to training design, trainers and trainees may engage in think-aloud or protocol analysis. Protocol analysis is a psychological research method in which information is gathered from verbal reports made by a participant. Think-aloud is a form of protocol analysis where an individual engages in some task while describing what they are doing, seeing, feeling and thinking. Think-alouds and protocol analysis techniques have been used as a means to better understand individual thought processes and have been shown to be an effective way to communicate knowledge to novices (Duffy et al., 1986).

To illustrate, consider a third generation style training aimed at helping employees at an automotive repair shop correctly diagnose mechanical problems. In such a training, groups of trainees would work through the training collaboratively and the think-aloud technique might be used by the instructor or a more experienced trainee to explain the thought process involved in a particular diagnosis. For example, a trainee with experience diagnosing worn piston rings could help his/her fellow trainees understand the diagnosis process by stating out loud what he/she is looking at, thinking, doing, and feeling. The person offering the think-aloud might also explain or justify each of his/her actions. Through this process, less experienced trainees would gain a better understanding of an effective method to diagnose worn piston rings.

Research has shown that think-alouds are an effective method of knowledge communication. For example, Duffy et al. (1986) demonstrated that think-alouds can assists teachers in helping students understand reading or problem-solving strategies. A review of the think-aloud literature provides a convincing argument for the utility of think-alouds as a mode of

better understanding the goal directed processing of expert readers (Kucan & Beck, 1997). Additionally, Kucan and Beck argued that think-alouds are quite useful as a mode of instruction and seem to work well in collaborative situations in which students learn from fellow students. Thus, in a third generation training context, one might expect that the verbal explanations of training content, offered by the trainer and more experienced trainees, would help less experienced trainees better comprehend the content.

Development of social skills. In the third generation approach to training design, trainees also develop social skills in addition to task-related skills. Social skills can be defined as a group of skills including social perceptiveness, coordination, persuasion, negotiation, instructing, helping, and so forth (Mumford, Peterson, & Childs, 1999). Trainees in third generation style trainings are frequently presented with opportunities to use and improve their social skills.

Social skill development can result from the interactions that are a part of a collaborative learning process. This natural development of trainee social skills resembles the development that occurs as a result of social skills training used in many organizations. Barron and Gideon (2000) discussed the utility of social skills training in improving entrepreneurs' performance through increases in social capital. Social capital is essentially the material resources gained by knowing others, being part of a social network, or having a good reputation among others. According to these researchers, entrepreneurs with social skills training may avoid common pitfalls including making poor first impressions, failing to generate enthusiasm for a new idea or irritating those they are attempting to persuade. Furthermore, Barron and Gideon stated that entrepreneurs who are high in social skills are more likely to obtain sources of funding, maintain advantageous relationships, attract and hire quality employees, and close important business deals. In support of Barron and Gideon's assertions, an empirical study by Seibert, Kraimer and

Liden (2001), demonstrated the importance of social capital to career success. This study indicates that social capital, gained through one's social skills, influences access to resources and information as well as the level of career sponsorship. Career sponsorship is the extent to which senor colleagues have provided protection, sponsorship, visibility and exposure. In summary, those with higher social skills are more likely to experience greater access to information, resources and sponsorship which eventually impact indicators of career success, including salary, promotions, and career satisfaction (Seibert et al., 2001).

Improved social skills not only improve the performance of those in entrepreneurial positions, they also improve performance among supervisors and employees working in teams. Research by Latham and Saari (1979) demonstrated the effect social skills training had on the performance of first-line supervisors. In their study, Latham and Saari randomly selected and assigned 40 supervisors to either a social skills training condition, based on Bandura's social learning theory (Bandura, 1977), or to a control condition. Results indicated that those supervisors who participated in the training program performed significantly better on a learning test given six months after training, and showed higher performance on behavioral simulations and performance ratings collected three months and one year after training, respectively. Likewise, a study by Morgeson, Reider, and Campion (2005) showed that social skills are beneficial for employees working in teams. In fact, their study indicated that social skills are a uniquely important predictor of contextual performance, which is conceptualized as interpersonal facilitation, interpersonal helping, job dedication and individual initiative. In conclusion, the social skills acquired during a third generation style training, should result in better employee performance at various levels of the organization. Also, improvements in socials skills should

result in better transfer of training content, since those newly trained employees are able to socially negotiate the application of their newly acquired knowledge to different contexts.

Negotiation of meaning. Another component of a third generation approach to training design is the negotiation of meaning. Negotiation of meaning can be thought of as a process of discussion through which individuals come to a common understanding of some idea or concept. When employees complete training programs designed using a social constructivist framework, they gain experience in the social negotiation of important training concepts. This means that they work with group members to come to a common understanding of the training content. In support of such an approach to training, Hiltz (1994) stated that "the social process of developing shared understanding through interaction is the 'natural' way for people to learn" (p. 22). A third generation approach to training design is based on this same supposition.

For example, imagine a group of retail store managers are completing a management training based on third generation design principles. To move through the material, trainees have to negotiate the meaning of a number of concepts with their group. In this case, assume the group is working on negotiating the meaning of "effective time management." To proceed, it is necessary that all members come to a common understanding of what it means to manage time effectively. In such a situation, each member might contribute information regarding what they believe effective time management is. This information might come from the training material, discussions with the instructor, or personal experience. Regardless of the source of information, the group will eventually come to a common understanding of the meaning of "effective time management." Once this has been accomplished, the training can continue and the group can be confident that each member is referring to the same concept.

The importance of negotiating meaning becomes increasingly clear when one understands its relevance in the workplace. To repeat an example used above, imagine a manager wishes to effectively delegate a task to one of his or her subordinates. To do this, there must be a common understanding of the manager's authority, what is involved in the task, and what criteria will be used to determine if the task is complete or if it has been completed satisfactorily. Without this common understanding, the employee may not agree to the manager's request, he or she may not complete all parts of the task, or the task might not be completed satisfactorily. Thus, negotiation of meaning is an important skill for interacting with others in an organization. Likewise, learning to negotiate meaning can help ensure the transfer of trained skills. Suppose a manager completed the management training mentioned above, and was promoted and transferred to another region of the company. It may be that the appropriate conceptualization of "effective time management" has changed along with the new position and region. However, since this manager understands how to negotiate the meaning of important training concepts with others, he or she will be able to negotiate the meaning of "effective time management" for the new situation. In essence, the practice of negotiating meaning during training should improve trainees' ability to negotiate the meaning of important concepts in different situations. This means that a third generation approach to training design should improve the transfer of trained skills.

Reflection. In the third generation approach to training design, trainees are provided with frequent opportunities for reflection. Reflection can be thought of as consideration of some subject matter, idea, or purpose (Reflection, 2011). It has been argued that third generation approaches to training design may be particularly well suited for computer-mediated or web-based learning environments (Kraiger, 2008a). For example, in computer-mediated environments

that rely heavily on asynchronous forms of communication and allow relatively high levels of learner control, learners have time to reflect on training material and are provided with time to fully consider questions being asked and how they wish to respond. Alternatively, time for reflection may not always be possible in face-to-face training situations where the training pace is controlled more heavily by instructors and/or fellow trainees. This allotted time for deep reflection is yet another defining characteristic of the third generation approach to training design.

To illustrate, consider a group of employees completing a training program on their company's preferred approach to selling merchandise. If this training were designed using third generation instructional methods, all trainee groups would be given time to consider each piece of content presented to them and think of questions or comments that might add to their or their colleagues' understanding of the concept. In such a situation, trainees would be encouraged to use the time to reflect on the concept(s) being learned, their experiences, and possible questions or comments. Additionally, if the employees in the present example were participating in a computer-mediated training, it is likely the asynchronous style of communication would provide them with even more opportunities for reflection.

Research has indicated the positive effects that metacognition can have on both the depth of learning and training transfer. Metacognition is the awareness and self-monitoring of cognitive processes facilitating the encoding and retrieval of new information (Hertzog & Dunlosky, 2004). Metacognition differs from reflection in that it is considered to be higher order thinking, involving the active control of the cognitive processes engaged in learning (Livingston, 1997). Reflection, on the other hand, might be considered a more passive review of one's cognitions. Although reflection and metacognition are not synonymous, they share some core

characteristics. For example, according to Brown, Bransford, Ferrara and Campione (1983), metacognition includes planning, monitoring, and revising goal appropriate behavior. Likewise reflection is defined as "consideration of some subject matter, idea, or purpose" (Reflection, 2011). Considering one's purposes and planning behavior seem to be closely related activities. Engagement in deep reflection may be an indication of metacognitive behavior. Furthermore, it seems that the effective use of metacognitive skills depends heavily on the learning situation (Ford, Smith, Weissbein, Gully, & Salas 1998; Earley, Connolly, & Ekegren, 1989). I would contend that for metacognition to take place, a learner must be provided with adequate opportunities for reflection.

The opportunity to reflect on training content and engage in metacognition can result in deeper learning and improved transfer. This has been demonstrated by a number of research studies including one by Ford et al. (1998) in which 93 undergraduate students were tested using a radar operations task. Ford et al. found that metacognition (measured at the end of training) was related to task knowledge, skill acquisition, self-efficacy, and performance on a transfer task. The researchers explained that trainees who engage in metacognition reflect on the training experience to diagnose where they are having difficulties and make adjustments accordingly. Through these adjustments, trainees develop greater knowledge of the task and better performance strategies, both of which lead to a heightened sense of self-efficacy and better performance on the transfer task. A similar study by Schmidt and Ford (2003) further demonstrated the importance of metacognitive activities to training success. In this study, 79 undergraduate participants completed a training program on web page creation. The treatment group received a ten minute orientation to the use of metacognition. Results showed that metacognitive activity was a strong predictor of both declarative and procedural training

knowledge even after controlling for previous experience creating web pages. Moreover, post hoc analyses indicated that individuals who engaged in more metacognitive activity did not simply spend more time with training content than others but made better use of their time. In conclusion, although metacognitive training is not an inherent characteristic of a third generation approach to training design, reflection is. The opportunity to reflect on training content, questions from colleagues, and one's personal thoughts, provides the correct learning situation for metacognition to occur and this metacognitive activity results in deeper learning and improved training transfer.

Flattening of power. In the third generation approach to training design, trainees experience a "flattening of power." Flattening of power can be thought of as a reduction in social status differences between individuals and their fellow trainees, as well as between trainees and the trainer. Like reflection, flattening of power seems to be particularly well-suited for computer-mediated or web-based learning environments (Kraiger, 2008a; McGuire, Kiesler, & Siegel, 1987) but can also be manipulated in face-to-face environments (Christophel, 1990; Menzel & Carrell, 1999).

To illustrate the flattening of power in a third generation training, consider again the example of the sales training described above. In a computer-mediated version of this training, it is likely that the simple fact that all interaction is occurring via computers would result in reductions in social status differences between the learners and their group members and instructor. However, in such a training situation the instructor would also seek to address individual learners by name, use personal examples, humor, and encourage learner ideas and discussion (Arbaugh, 2001). In addition to these behaviors, instructors in a third generation, face-to-face version of the same sales approach training, would seek to make eye contact with

trainees, smile throughout the training, move around the classroom, and use gestures while speaking (Christophel, 1990).

Research on the flattening of power in face-to-face learning environments focuses primarily on the relationship between instructor and trainee. This line of research, also referred to as instructor immediacy, provides evidence that reducing the social distance between instructor and learner results in improved learning outcomes. For example, Christophel (1990) explored the impact of immediacy behaviors on learner motivation and learning and found that behaviors that reduced the social distance between the instructor and learners resulted in higher levels of motivation, which in turn increased learning. Similarly, Menzel and Carrell (1999) examined the impact of instructor immediacy in a sample of 256 undergraduate students. Results indicated a strong relationship between instructor immediacy and perceived learning at the conclusion of the course.

While, a flattening of power can be encouraged in face-to-face environments, it may occur more easily in computer-mediated situations. Dubrovsky, Kiesler, and Sethna (1991) conducted a study examining the difference in status effects for computer-mediated groups compared to face-to-face groups. Using a sample of 96 university students, the authors explored group member participation, advocacy of a decision, and group member influence in both types of decision making groups. Results indicated that "lower-status" group members participated more, and became advocates for a particular decision more often, when in a computer-mediated group as compared to a face-to-face group. Furthermore, this study showed that group member influence was more evenly distributed across high and low status group members in the computer-mediated condition. Dubrovsky et al. suggested that this equalization phenomenon

may result in groups focusing more attention on what is contributed than on who contributed to the group.

Other studies support these findings and describe other potential benefits to a computer-mediated flattening of power. Sproull and Kiesler (1986) examined the impact of computer-mediated communication on social context cues in a Fortune 500 company. Results from this study showed that computer-mediated communication resulted in a reduction of social context cues and led to less inhibited exchanges than face-to-face communication. This uninhibited communication then led to a number of positive outcomes including new and creative ideas, new information that would not have been shared otherwise, and freer expression of ideas from subordinates to superiors. Another study demonstrated that computer-mediated communication results in a more even distribution of influence across group members (Zigurs, Poole & DeSanctis, 1988). These researchers explained that in traditional face-to-face groups, where social cues are more salient, some individuals may be less likely to fully participate due to social fears or difficulties in verbally expressing themselves. On the other hand, computer-mediation offers a sense of anonymity and may represent a low threat form of communication. This in turn, can result in the expression of ideas and arguments that may have been lost otherwise (Zigurs et al., 1988). Finally, Bikson and Eveland (1990) showed that computer-mediated communication can help reduce barriers to social interaction, help develop richer communication structures, and result in greater feelings of group involvement. Each of these factors is obviously important for training situations where the quality of the training depends on the successful interactions of learners and the instructor.

In conclusion, the flattening of power that occurs as part of a third generation approach to training design can result in a number of positive outcomes which can affect learning and

transfer. Flattening of power in face-to-face environments can lead to improved learning outcomes. Similarly, flattening of power in computer-mediated situations, serves to evenly distribute group member influence and group member participation in training activities. Finally, a computer-mediated flattening of power results in important knowledge being shared with group members that might have been lost otherwise. All of these outcomes should be expected to impact the depth of learning and likelihood of transfer among trainees.

Purpose and Research Questions

Now that the various instructional methods characteristic of the third generation approach to training design have been described, I return to a discussion of the purpose of the present study and its research questions. Kraiger (2008b) suggested that as a discipline, Industrial/Organizational (I/O) psychology is "poised to make a profound shift in how [it] understands learning to occur and how we think about what should be trained and how that content should be trained" (p. 454). The purpose of the present study is to begin to operationalize and explore the effects of this third generation approach to training design on important organizational training outcomes including learning and training transfer. Although, there are a number of articles and book chapters concerning social constructivism in the education, educational psychology, and educational technology literatures, most are conceptual or theoretical in nature. Some researchers have published articles citing the benefits of the social constructivist conceptualizations of special education, child education, and web-based learning for adults (Trent, Artiles, & Englert, 1998; Palinscar, 1998; Woo & Reeves, 2007). However, I was unable to locate any articles in which researchers operationalized the characteristics of a social constructivist approach and empirically examined its effects on learning. Additionally, an

extensive search of the I/O literature revealed no research examining the differential effects of a social constructivist approach to training design compared to more traditional (e.g. first generation) approaches to training design. Thus the purpose of the present study is to address this gap in the literature by beginning to operationally define the third generation approach to training design and by comparing learning outcomes using this approach to those using a more traditional first generation approach. The present study will explore the following hypotheses:

Hypothesis 1 – When compared on a measure of recall, trainees in the third generation type training will outperform trainees in the first generation type training.

Hypothesis 2 – When compared on a measure of near transfer, trainees in the third generation type training will outperform trainees in the first generation type training.

Hypothesis 3 – When compared on a measure of far transfer, trainees in the third generation type training will outperform trainees in the first generation type training.

As described in the hypotheses above, I will be examining training effects across three dependent variables: free recall, near transfer, and far transfer. Free recall involves participants recalling a number of key concepts identified during training. This is a classic measure of learning in training. Near transfer is the application of learning to situations similar to those in which the original learning took place (Laker, 1990). In this study, I operationalized near transfer as the ability to identify key concepts (presented in the training) in a video presented immediately following training. Near transfer represents a deeper level of learning than simple recall. Far transfer is the application of learning to situations dissimilar to those in which the original learning took place (Laker, 1990). In this study, I operationalized far transfer as the ability to identify key concepts (presented in the training) in one's own life experiences during

the two weeks following training. Far transfer represents a level of learning deeper than both recall and near transfer.

METHOD

Participants

Participants were undergraduate students enrolled in an introductory psychology course at Colorado State University. Participants received two hours of research credit as incentive. A total of 202 individuals participated in the study. Due to technological and administration errors a number of cases were made unusable and were then excluded. Additionally, all participants who failed to complete the far transfer measure were excluded from the final dataset (n = 173). Participant demographics are displayed in Table 1. Overall, participants were between 19 and 45 years old (M_{age} = 19.6; SD = 3.5), mostly female (55%), white/Caucasian (83%), and in their first year of college (64%).

Procedure

As discussed above, there are a number of instructional methods characteristic of a third generation approach to training design. The present study focuses on five: collaborative learning, think-alouds, social skill development, negotiation of meaning, and flattening of power.

Before arriving, participants were assigned to one of two conditions, either first or third generation training, depending on the day or time for which they signed up. Both conditions were run each week during data collection on rotating day and times. In other words, neither condition was run consistently on the same day of the week or at the same time of the day. The experiments were held in small rooms in which participants completed the online training and all measures through the use of computers. Before the experiment began, participants were presented with a cover letter document outlining the purpose and potential risks and benefits of the study.

First generation. Those in the first generation training condition were expected to complete the training by themselves. Before training began, participants were told: "This particular training has been designed by experts in the field of training and development and has been shown to be an effective method of instruction on the topic of communication." This statement was meant to create the social distance between instructor and trainees that is common in first generation type trainings. Next, participants were presented with a series of slides and audio commentary outlining the importance of effective communication, the consequences of poor communication, and the different types of communication.

In the next section of the training, participants viewed a 35-minute video clip of five individuals engaging in a one-way communication task followed by a two-way communication task (see appendix A). The task in the video was the same task completed by participants in the third generation training program. This video also included the discussion portion of the communication task in which individuals identify the various barriers to and strategies for effective communication. Next, participants were presented with a master list of barriers and strategies. This list included all barriers and strategies identified in the video in addition to a number of barriers and strategies that were not mentioned. Each of the barriers and strategies were briefly explained in another short series of slides accompanied by audio commentary. Finally, participants were given five minutes to study this master list of barriers and strategies.

Once the training session was finished, participants completed a short training reaction questionnaire (see appendix C for all measures).This also provided participants with a short temporal and cognitive break from the training material. Following the reaction measure, participants completed a recall test regarding the trained material. Participants were asked to list all barriers and strategies to effective communication. Next, participants completed the near

transfer measure which involved watching two video clips of communication between individuals in a real-life work situation. Participants were asked to list the barriers to and strategies for effective communication that were demonstrated in these videos. The measure of far transfer was completed two weeks later, when participants were given access to a link for a survey. Far transfer required participants to indicate the extent to which they implemented the communication skills acquired during training in their own lives.

Third generation. Those in the third generation condition completed the entire training, in groups of four or five via chat interactions on computers. Again, participants were asked not to speak with other trainees outside of the computer-mediated interactions. Before training began, participants were told that "each trainee's participation is equally important for individual success and the success of the training group." They were further instructed that "although the instructor has prepared the training material, it is important that all of you as trainees seek to proceed with the training material as you see fit. This means taking extra time to study or discuss concepts that you feel need more attention, pausing to reflect on what you have learned or what questions you need to ask, and working to come to a shared understanding of the material. Remember that each of you has an equal influence on what happens during the training." This statement was meant to reduce social distance between fellow trainees and the instructor and result in a flattening of power. Finally, participants were told "please try your best both as an individual and as a group to participate and learn the material, since you will be held responsible for both your personal and group contributions." This final statement was meant to encourage accountability at the individual and group level which is a component of collaborative learning. Additionally, collaborative learning was encouraged through the use of the interdependent communication they engaged in.

Once participants had completed the same training slides and commentary that the first generation received, they continued on to the activity portion of the training. During this stage of the training, participants were asked to participate in the same communication tasks that were demonstrated to the first generation group (see appendix A). The training instructor acted the part of facilitator during the task. Once both communication tasks were completed, the instructor led a discussion of the various barriers and strategies to effective communication and asked participants to justify each. The time allotted for the activity and discussion of barriers and strategies was 35 minutes. During this time, the instructor encouraged each trainee to participate by asking for contributions from less active trainees. Each time a trainee suggested a barrier or strategy to effective communication, the instructor asked them to explain their reasoning to the group, and asked the group to be sure to reach a common understanding of the barrier or strategy and how or why it impacts communication. If two ideas were very similar the instructor required the trainees to discuss them and decide if they were the same or actually distinct. These explanations and discussions were designed to encourage social skill development, the negotiation of meaning, and the use of think-alouds.

Participants were encouraged to continue generating new barriers and strategies and discussing them for all 35 minutes. Following this discussion period, participants were presented with a master list of all possible barriers and strategies. This master list included all barriers and strategies identified in their group discussion in addition to a number of barriers and strategies the group may not have mentioned. Each of the barriers and strategies were briefly explained in another short series of slides identical to those presented to the first generation condition. Participants were then given five minutes to study this master list of barriers and strategies.

Finally, participants completed the same knowledge and transfer tasks as the first generation group. Total time spent in training was approximately the same for both conditions.

Measures/Materials

Participants began the study by completing a brief measure of intelligence assessed using the Wonderlic Cognitive Ability Pretest (Wonderlic, 2011). Cognitive ability was measured to serve as a possible control variable. Next, general demographic information including gender, age, and race, were collected (see appendix B).

Immediately following training, participants completed a brief training reaction measure (see appendix C for all measures). Items 1-10 of the reaction measure were designed to reflect the major dimensions of trainee reactions described by Brown (2005). These items were used to create a general reaction variable (called Reaction 1). Items 11-13, 16, 17, and 19 were combined to create a second reaction variable (Reaction 2). These items assessed reactions to instructional methods consistent with third generation training (e.g. "I felt lower in status compared to the instructor" reverse coded). Items 14, 15, and 18 were combined to create a third reaction variable (Reaction 3). These items were only answered by third generation participants and were designed to assess participant reactions to the training in relation to components that should have been viewed favorably if successful manipulation of the third generation condition occurred. All items were rated on a scale from 1 to 6 with 1= strongly disagree and 6 = strongly agree.

The dependent variables for this study were measured both immediately following the training (knowledge and near-transfer measures) and two weeks following the training intervention (far transfer measure). The first dependent variable was recall of the trained material. This measure simply asked participants to list all of the barriers and strategies to effective communication that were identified. The number of correctly recalled items was

summed to create a total recall score. Next, to measure near transfer, I created two animated videos designed to demonstrate various barriers to and strategies for effective communication. In the first video, two coworkers engage in an important discussion while demonstrating a number of barriers. In the second video, these same coworkers demonstrate effective communication strategies. These videos were used to assess participants' ability to apply their newly acquired communication skills to a real life situation. Participants were asked to identify all the barriers and strategies demonstrated in the video clips. The number of correctly identified items was summed to create a total near transfer score. To ensure objectivity, each video clip was coded by four judges familiar with the barriers and strategies. Only barriers and strategies that were identified by three of the four judges were considered to be demonstrated in the video clips. This produced a total of 13 barriers and 18 strategies present in each clip respectively. Scores were determined by counting the total number of correctly identified barriers and strategies.

The final dependent variable was far transfer which was measured via an online survey, made available to participants two weeks following the original training. This survey consisted of 17 items designed to assess the extent of communication skill demonstrated in participants' lives over the previous two week period. Participants were asked to provide answers to 17 statements (e.g. "I have sought to clearly define my terms") using a five point Likert-type scale ranging from never to always. The average of participants' responses was used to create a total far transfer score.

Analyses

To examine the differences in trainee performance immediately following, and two weeks after the training, multivariate analysis of covariance (MANCOVA) was employed. This procedure allowed the examination all three dependent variables (recall, near transfer, and far

transfer) and consideration of the impact of important covariates including cognitive ability, self-reported communication ability, and reaction to the training.

RESULTS

Overall means and standard deviations and **c**orrelations among all study variables are displayed in Table 1. This table shows that recall was highly correlated with near transfer (r = .74), as expected, but not far transfer (r = .14). Near transfer showed a significant correlation with recall only. Potential covariates were screened by examining zero-order correlations of each with the three dependent variables. Recall showed significant but relatively small positive correlations with age, gender (women performed slightly better), years in college, and interest in the training topic. Near transfer showed significant but small positive correlations with gender (women performed slightly better), and years in college. Finally, far transfer showed significant, positive, but relatively small, correlations with number of siblings, interest in the training topic, self-related communication ability, and self-rated social skills. Far transfer also showed moderate significant correlations with Reaction 1, Reaction 2, and Reaction 3 (.34, .22, and .33 respectively).

Before proceeding with the MANOVA analyses, each of its three main assumptions was checked although MANVOA is generally very robust to violations of these assumptions (Tabachnick & Fidell, 2009). First, normality was examined using frequency distributions to visually examine each dependent variable and by calculating both skew and kurtosis. A visual examination of the frequency distributions showed each of the dependent variables to be approximately normally distributed with the exceptions of some possible positive skew recall. This finding was confirmed with the skew statistic which indicated approximate symmetry for both near and far transfer and moderate skew for recall (Skew = .53, SE = .19) (Blumer, 1979). An examination kurtosis revealed that both near and far transfer were approximately mesokurtic, while recall was flagged as being slightly leptokurtic (Kurtosis = 1.11, SE = .37). Finally, normal

probability plots and detrended normal probability plots were examined and seemed to indicate that each of the dependent variables was normally distributed.

Second, the assumption of linearity in the dependent variables was examined using scatterplots of each variable with the others. These plots showed a clear linear relationship between recall and near transfer and no pattern for the combination of recall/far transfer and near transfer/far transfer. However, no "horseshoe" shaped trends were detected indicating no significant violations of this assumption. Third, the assumption of homoscedasticity was examined using Box's M test. This assumption was violated for all of the subsequent analyses and thus, Pillai's trace is reported as the multivariate test statistic below (Tabachnick & Fidell, 2009).

Table 2 displays the means and standard deviations for each of the dependent variables by condition. An examination of this table clearly shows higher mean scores for the first generation condition on all three dependent variables. However it is interesting to note the large standard deviations for each of these means. In the case of both recall and near transfer, the SD is at least half the size of the mean. This indicates large within group variability with small between group differences. Based on the pattern of results described above it was unlikely any group differences would be found through the MANOVA analyses.

MANOVA Analyses

Hypotheses 1, 2, and 3 sought to determine if trainees in the third generation type training would outperform those in the first generation type training on measures of recall, near transfer, and far transfer respectively. These hypotheses were examined using MANOVA. These results showed that there was no significant multivariate effect for training condition on the recall and two transfer outcomes (Pillai's Trace = .01, $F(3, 169) = .80$, $\eta_p^2 = .01$, $p = .50$). The squared

multivariate R = .014 indicated that only 1.4% of the variance in the dependent variables could be accounted for by training condition. As shown in Table 3, the follow-up univariate between-subjects tests showed no significant differences on any of the dependent variables based on training condition.

Next, two MANCOVAs were employed to further explore the multivariate effects first controlling for cognitive ability and self-reported communication, and next, controlling for reactions to the training. Cognitive ability and self-reported communication ability were controlled because they are both well-known predictors of training performance (Salas & Cannon-Bowers, 2001) and might be expected to have an impact on training recall and near transfer. Training reactions were controlled due to their established moderate relationship with training performance (Alliger, Tannenbaum, Bennett, Traver, & Shotland, 1997) and due to the large correlations with far transfer found in this study. Results indicated that when controlling for cognitive ability and self-reported communication skills there was no significant multivariate effect (Pillai's Trace = .03, $F(3, 138) = 1.50$, $\eta_p^2 = .03$, $p = .22$). However, the univariate tests showed that both recall and near transfer were marginally significant (see Table 3). Likewise, when controlling for Reaction 1 and Reaction 2, there was no significant multivariate effect (Pillai's Trace = .01, $F(3, 169) = .80$, $\eta_p^2 = .01$, $p = .50$) but the univariate test showed far transfer to be significant (see Table 3). These results suggest that while there are no significant multivariate effects, there are substantive univariate differences between groups if relevant control variables are taken into account. Finally, a series of ANCOVAs were used to further explore the univariate relationships and obtain the estimated marginal means for each analysis. Results indicated higher estimated marginal means for the first generation condition on each of the dependent variables.

In summary, the results did not support hypothesis 1, 2, or 3. These findings show that when controlling for self-reported communication ability and cognitive ability, participants in the first generation condition outperformed those in the third, on both recall and near transfer. Furthermore, when controlling for reactions to the training content, participants in the first generation condition outperformed those in the third, on far transfer. However, it is important to note the extremely small effect sizes associated with all of these analyses. Indeed, the highest effect size obtained was .03 (for the univariate effect of training group on far transfer, controlling for Reaction 1 and 2). This means that at best, training condition account for less than 3% of the variance in any or all of the dependent variables.

In addition to the analyses above, the respectable correlations between far transfer and the reaction measures spurred further examination of this relationship. First, examining the group means for the reaction measures, it was found that the third generation condition rated their satisfaction with the training (Reaction 1) significantly higher than the first generation condition ($t(171) = -4.308$, $p < .001$). Additionally a t-test indicated significantly higher scores ($t(171) = -8.18$, $p < .001$) among the third generation participants on Reaction 2 (designed to measure satisfaction with third generation instructional components such as "flattening of power"). Finally, the mean of the reaction items designed to indicate successful manipulation of the third generation condition (Reaction 3) was quite high (Mean = 4.26, SD = .808). Altogether these findings indicate that training participants were generally more satisfied with the third generation design and that the third generation manipulations were effective.

Finally, a series of t-tests, ignoring training condition, revealed non-significant differences in recall and near transfer for individuals high verse low on the reaction measure ($t(159) = -1.94$, $p = .23$; $t(159) = -.390$, $p = .70$). However, a significant difference was found for

far transfer such that those who were highly satisfied with training (either condition) scored higher on the measure of far transfer than those who had low satisfaction with training ($t(159) = -2.57$, $p = .01$). Together these analyses indicate that while satisfaction with training may not impact recall or near transfer, it has a significant impact on far transfer.

Table 1. Means, Standard Deviations, and Correlations of Study Variables

	M	SD	1	2	3	4	5	6	7	8
1. Age	19.61	3.45	--							
2. Gender	--	--	.11	--						
3. Years in college	1.63	1.02	.53*	-.03	--					
4. Number of siblings	2.17	1.81	.14	.08	.03	--				
5. Taken a communication class	--	--	-.16*	.03	-.33*	.02	--			
6. Grade in communication class	4.59	.55	-.07	.03	-.19	-.19	-.13	--		
7. Interest in training topic	3.06	.99	.01	.20*	.07	.05	-.27*	.07	--	
8. Self-rated communication ability	3.70	.89	.08	-.06	.11	-.07	-.25*	.07	.24*	--
9. Self-rated social skills	3.81	.80	-.06	.02	.10	-.01	-.24*	.19	.20*	.61*
10. Cognitive ability	23.86	3.37	.09	-.34*	.13	-.13	-.06	.07	.01	.15
11. Reaction 1	3.84	.88	.02	.17*	-.06	.11	.17*	-.13	.28*	-.04
12. Reaction 2	3.96	.71	-.04	.12	.01	.10	-.01	-.11	.09	.12
13. Reaction 3	4.26	.81	.07	.06	-.10	.02	.13	.03	.12	-.02
14. Recall	16.40	8.73	.22*	.20*	.21*	.06	-.07	.09	.17*	-.09
15. Near transfer	10.48	4.76	.10	.23*	.18*	.01	-.04	.05	.14	-.06
16. Far transfer	3.56	.51	.04	.03	-.08	.18*	-.07	.06	.18*	.25*
17. Training condition	--	--	-.12	.07	.01	-.13	-.06	.10	.01	.10

Note. Grade in communication class is coded such that 1 = F and 5 = A. Taken a communication class is coded 1 = Yes and 2 = No. Reaction 1 = general reaction to the training (items 1-10). Reaction 2 = reactions to third generation components (items 11-13, 16, 17, 19) Reaction 3 = reactions to third generation components (items 14,15,18 presented only to third generation participants)
*$p < .05$.

Table 1 Continued. Means, Standard Deviations, and Correlations of Study Variables

	9	10	11	12	13	14	15	16	17
1. Age									
2. Gender									
3. Years in college									
4. Number of siblings									
5. Taken a communication class									
6. Grade in communication class									
7. Interest in training topic									
8. Self-rated communication ability									
9. Self-rated social skills	--								
10. Cognitive ability	.05	--							
11. Reaction 1	-.06	-.11	--						
12. Reaction 2	-.04	.07	.56*	--					
13. Reaction 3	.01	.00	.60*	.60*	--				
14. Recall	-.08	-.07	-.01	-.05	.14	--			
15. Near transfer	-.03	.01	-.02	-.08	.11	.74*	--		
16. Far transfer	.19*	-.13	.34*	.22*	.33*	.14	.01	--	
17. Training condition	-.01	.10	.32*	.53*	--	-.12	-.09	-.02	--

Note. Grade in communication class is coded such that 1 = F and 5 = A. Taken a communication class is coded 1 = Yes and 2 = No. Reaction 1 = general reaction to the training (items 1-10). Reaction 2 = reactions to third generation components (items 11-13, 16, 17, 19) Reaction 3 = reactions to third generation components (items 14,15,18 presented only to third generation participants)
*$p < .05$.

Table 2. Means and standard deviations of Analyzed Variables

Variable	First Generation (*n* = 86)		Third Generation (*n* = 87)	
	Mean	SD	Mean	SD
Recall	17.43	9.59	15.39	7.70
Near Transfer	10.92	5.20	10.05	4.27
Far Transfer	3.57	.49	3.55	.53
Cognitive ability	23.51	3.70	24.19	3.02
Reaction 1	3.56	.87	4.12	.80
Reaction 2	3.58	.59	4.33	.61
Reaction 3	--	--	4.27	.81

Note. Reaction 1 = general reaction to the training (items 1-10). Reaction 2 = reactions to third generation components (items 11-13, 16, 17, 19) Reaction 3 = reactions to third generation components (items 14,15,18 presented only to third generation participants)

Table 3. Univariate Results from MANVOVA/MANCOVA Analyses.

Dependent Variables	*F*	p-value	η_p^2
MANOVA			
Recall	2.38	.13	.01
Near Transfer	1.46	.23	.01
Far Transfer	.05	.83	.00
MANCOVA (controlling for communication ability and cognitive ability)			
Recall	3.22	.07	.02
Near Transfer	3.79	.05	.03
Far Transfer	.25	.62	.01
MANCOVA (controlling for Reaction 1 & 2)			
Recall	2.03	.16	.01
Near Transfer	.64	.43	.00
Far Transfer	5.22	.02	.03

DISCUSSION

The purpose of this study was to assess the differences in trainee performance on measures of recall, near transfer and far transfer, for trainees comparing first and third generation training. Specifically, it was hypothesized that participants in the third generation type training would outperform those in the first generation type training on each of the abovementioned measures.

Results indicated that there were no significant multivariate differences between groups on measures of recall, near transfer or far transfer. The univariate results also indicated no significant differences between groups on any of the measures. Only 1.4% of the variance in group membership (training condition) could be accounted for by the combination of dependent variables (recall, near and far transfer). Based on these findings, I decided to further examine the multivariate effects using relevant covariates. Note that these additional analyses are strictly exploratory in that they were not based on theory or hypotheses outlined prior to their analysis. Thus, all findings from these analyses should be interpreted with caution.

Recall/Near Transfer

I began these exploratory analyses by adding both cognitive ability and self-reported communication ability into the original MANOVA. Results indicated that when controlling for these two covariates the multivariate effect was still non-significant. However, the univariate effects for both recall and near transfer became marginally significant such that third generation participants outperformed first generation participants. These findings indicate that when holding constant cognitive ability (a well-known predictor of training performance, (Salas & Cannon-Bowers, 2001)) and self-reported communication ability (a proxy for self-efficacy, another predictor of training performance (Salas & Cannon-Bowers, 2001)), first generation trainees are

likely to perform better on a measure of recall and near transfer compared to third generation trainees.

This may not be terribly surprising when one considers past research demonstrating that training, designed to maximize recall and near transfer, may not always maximize far transfer. Consistent with Schmidt & Bjork (1992), those in the more complex training condition (third generation) performed worse on a measure of recall and near transfer compared to those in the simpler training condition (first generation). Thus, it may be that the simple training design of the first generation condition worked to produce better recall and near transfer compared to the more complex and varied training design of the third generation condition which would be expected to result in lower recall and near transfer scores but eventually result in higher far transfer scores.

As an example of this argument, consider Catalano and Kleiner (1984). In this study, the researchers examined trainee performance on a motor task. Participants were instructed to press a button when a simulated moving object reached a predetermined point. Each participant was assigned to either a constant or variable training condition. Those in the constant condition were trained with the object moving at one of four constant speeds (5, 7, 9, or 11 mph). Those in the variable condition were trained with the object randomly alternating among all four speeds for the same number of trials. Results indicated that while retention and generalization was superior for the variable condition, acquisition was superior for those in the constant condition. In the present study, the first generation training condition might be compared to the constant condition mentioned above. That is, because the first generation training design was simple, linear in terms of its progression and structure, and low in variability, participants actually demonstrated

superior recall and near transfer compared to those in the more complex third generation training.

Another possible explanation for the poor recall and near transfer performance in the third generation condition is that collaboration actually impairs recall (Rajaram, 2011). A phenomenon known as collaborative inhibition (Weldon & Bellinger, 1997) suggests that recall of encoded material can be negatively impacted by collaboration during a recall task (Rajaram & Pereira-Pasarin, 2010). However, it is important to note that within the collaborative inhibition literature, impairment of recall is theorized to arise from retrieval disruption occurring during the retrieval process of group recall. In other words, while recalling information, group members' retrieval plans disrupt the retrieval plans of others (Basden, Basden, Bryner, & Thomas, 1997). For the present study however, the concept of collaborative inhibition does not directly apply since learners were not asked to recall in groups.

Although the majority of the literature concerning impaired recall though collaboration involves the study of collaborative inhibition (i.e. group recall problems) there is a more recent and much smaller body of research investigating the impact of collaborative encoding on subsequent individual recall. Barber, Rajaram, and Aron (2010) found that encoding collaboratively (in pairs) and recalling individually resulted in much lower recall scores than conditions in which participants encoded that same information individually.

While Barber et al. (2010) may help explain the poor recall and near transfer performance among third generation participants in the present study, it should also be noted that the experimental procedure for encoding was radically different from the encoding that should take place during third generation training. Specifically, the procedure used by Barber et al. allowed almost no communication between partners during the collaboration process. However, in third

generation training conditions, open communication is encouraged to help all group members come to a common understanding of the content being covered. Perhaps, the amount of communication actually stimulated in the present study was closer to the conditions created by Barber et al. as opposed to the ideal third generation conditions outlined by Kraiger (2008a).

Far Transfer

In addition to the exploratory analyses just described, I also ran the original MANOVA including only the trainee reaction measures (Reaction 1 and Reaction 2), as control variables. Results indicated that when controlling for these two covariates the multivariate effect was still non-significant. However, the univariate effects for far transfer became significant such that those in the first generation condition outperformed those in the third generation condition (see table 3). These findings may indicate that, holding constant trainee reactions (another well-known predictor of training performance (Alliger et al., 1997), first generation trainees are likely to perform better on a measure of far transfer compared to third generation trainees.

Although this finding may be true, there is little existing research to support such a result. In fact, research would seem to indicate that less structured and straightforward training approaches (like the third generation approach used in this study) produce deeper learning and improved transfer when compared to more traditional information presentation (first generation) type training approaches (Schmidt & Bjork, 1992; Holliday & Quiñones , 2003). Thus these counterintuitive finding may be the results of a number of different issues.

The first explanation for these counterintuitive findings is that the theory that these hypotheses were built on are flawed. Because there was no existing literature on the third generation approach to training design (Kraiger, 2008a excepted), this study was built on a combination of theories and research from the education, educational psychology, and

educational technology literatures. Thus, the theoretical basis for the present study is a patchwork of theories not designed for application in industrial/organizational settings, and unsupported in its current form. In sum, it could be that the theory is flawed and first generation trainees perform better on measures of recall, near transfer and far transfer.

A second explanation for the counterintuitive findings concerning far transfer is that third generation training may not have been correctly operationalized. It is possible that important characteristic and instructional methods that define third generation training were never identified. For example, maybe third generation training, involves some aspect of a shared common goal. The present study required participants to discuss barriers and strategies to communication in a small group but lacked any ultimate goal shared by the group. Third generation training is concerned with constructing a shared or negotiated understanding of training content which may not occur if participants are not motivated by a shared goal.

Another problem with the operationalization of the third generation approach is that although it was assumed that a third generation training design was being implemented, certain crucial aspects of a third generation design may have been omitted. For example, in an attempt to create similar control and treatment groups, in terms of total time spend in training, two of the third generation instructional methods (adaptive guidance and reflection/metacognition) were omitted. It could be that these two instructional methods are crucial to the creation of a true third generation type training. In other words, because participants did not have the ability to control the flow, pace, and direction of their learning experience, a third generation condition was never truly created.

Another issue with the operationalization of the third generation approach could be that the combination of the instructional methods was inappropriate for the training content and

condition. For example, maybe the topic of communication can be most effectively trained using a combination of adaptive guidance, negotiation of meaning and flattening of power. Another concern could be that the manipulation of the third generation instructional methods was not strong enough to create third generation training. For example, perhaps if the present study had sought to more clearly manipulate the interdependent aspect of collaborative learning by offering a reward to high performing groups, a true third generation condition would have been created. Additionally, it could be that the training was simply too short or not complex enough. In other words, to see an effect, third generation training may require a more substantial time investment or a more complex design than the one created for this study. For example, Katz (1995) suggested that effective computer supported collaborative learning should offer direct guidance and structure for peer interactions, give students something challenging to talk about, and enable students to resolve conflicts that arise during the learning process. Had Katz's suggestions been adopted in the present study, the training would have become more complex but might have also resulted in a successful collaborative learning environment. A third explanation for the counterintuitive findings concerning far transfer is that some important moderator variable was unaccounted for in this study. For example, opportunity to perform may have been an important moderator to consider. Ford, Quiñones, Sego, and Sorra (1992) demonstrated that a work context that facilitates the opportunity to perform trained tasks is an important contributor to training transfer. In other words, because participants in this study were not required and/or did not feel the need to immediately use the skills acquired in training, transfer never really occurred, resulting in small observed relationships between training condition and transfer. It is possible that different results would have been obtained if the study had been conducted in an organizational setting where the skills learned in training were directly applicable to relevant job

tasks and where management and coworkers were expecting the employee to demonstrate the newly acquired knowledge and skills. In such a case, the work context would have elicited the performance of trained tasks. In sum, the nonexistent relationship between training design and far transfer may have been due to the simple fact that participants' opportunity to perform newly acquired skills was low.

Closely related, a fourth explanation for the counterintuitive findings concerning far transfer is that transfer never occurred because of low motivation to transfer among participants. Motivation to transfer was defined by Noe (1986, p. 743) as "the trainees' desire to use the knowledge and skills mastered in the training program on the job." Although research is still inconclusive (Gegenfurtner, Veermans, Festner, & Gruber, 2009), a number of studies have found support for the relationship between motivation to transfer and transfer outcomes (Axtell, Maitlis & Yearta, 1997; Chiaburu & Lindsay, 2008; Machin & Fogarty, 1997). For example, Bates, Holton, Seyler, and Carvalho (2000) showed that motivation to transfer is a significant predictor of individual training transfer. Specifically, motivation to transfer accounted for 33% of the variance in individual transfer results.

Research has also identified important antecedents to motivation to transfer. In a review, Gegenfurtner, et al. (2009) identified a number of considerations for encouraging motivation to transfer. For example, transfer motivation can be affected by how the training is framed before it is even implemented. Additionally, training motivation can be affected by the organizational normative context, factors associated with the training instruction, and even trainee perceptions of the work environment following training. In the present study, motivation to transfer was not measured and was not encouraged through any of the means discussed by Gegenfurtner et al. (2009). Participants were presented with training content on communication, but as mentioned

above, had no workplace in which to apply their newly acquired skill. Thus, a plausible explanation for the counter intuitive findings concerning far transfer is that motivation to transfer was low among all participants and thus far transfer never truly occurred.

Training Reactions

In addition to the multivariate and univariate analyses described above, simple t tests were used to examine the three training reaction measures. Results showed that the third generation condition rated their satisfaction with the training (Reaction 1) significantly higher than the first generation condition. Additionally significantly higher scores were found among the third generation participants on Reaction 2 (designed to measure satisfaction with third generation instructional components such as "flattening of power"). Finally, the mean of the reaction items designed to indicate successful manipulation of the third generation condition (Reaction 3) was quite high. These findings indicate that training participants were generally more satisfied with the third generation design and that the third generation manipulations were effective.

Further analyses, ignoring training conditions, revealed non-significant differences in recall and near transfer for individuals who were high verse low on the reaction measure. In other words, scores on recall and near transfer apparently do not depend on trainee satisfaction with training. However, a significant difference was found for far transfer such that those who were highly satisfied with training (either condition) scored higher on the measure of far transfer than those who had low satisfaction with training. This indicates that satisfied trainees are likely to perform better on a measure of far transfer than their less satisfied counterparts.

In summary, no support was found for hypothesis 1, 2, or 3. Based on the results obtained from this study it seems that there are no meaningful differences in recall, near transfer, or far

transfer when comparing participants in a first generation training condition to those in a third generation training condition. However, exploratory analyses of the recall and near transfer univariate effects (controlling for self-reported communication ability and cognitive ability) may indicate some superiority of the first generation training design in enabling recall and near transfer. Alternately, the far transfer univariate effects (controlling for reactions to the training) seem counterintuitive and counter-theoretical and based on the numerous alternate explanations available should be interpreted with caution.

Limitation and Future Directions

Although a number of limitations in regard to the far transfer measure have already been discussed, there are other, more general issues that that must be considered. First, some might see the scope of the study as limitation. It should be noted that this study did not seek to determine exactly which components of the third or first generation approaches have the greatest effects on learning outcomes. Because this study is one of the first steps in testing the different generations of training, its objective was simply to determine whether or not there are important differences between the first and third generations in terms of recall, near and far transfer. Thus no attempts were made to examine the effects of the individual instructional methods characteristic of the third generation approach to training design.

Another limitation of the study is its sample. Some research has suggested that college student samples may not be representative of more general populations that one would expect to encounter in the workplace. For example, Sears (1986) contends that college student samples tend to have less-crystallized attitudes, stronger tendencies to comply with authority, and more unstable peer group relationships than more mature adult samples. Indeed, as mentioned above, there may be significant differences (in terms of motivation) among a sample of college students

compared to a sample of employees. Although the sample of college students used in this study may well represent a limitation to the study, many of the participants will be entering the job market within the next two to three years and could represent the effects that might be expected among a young sample of employees.

Next, the incongruent nature of the training and the eventual training transfer measure could be considered a limitation. Although the training transfer measure was based on the display of skills (e.g. using points of reference and encouraging others to ask questions etc.) the training focused primarily on the skill of information recall and not the actual display of communication strategies like those just listed. Had the training prepared participants to display the skills that would eventually be assessed with the far transfer measure the results may have been quite different. Stated differently, one would not expect an employee to demonstrate Excel calculation skills in a real job situation if he/she had been trained only to memorize "function" names and their purposes. Likewise can a trainee be expected to demonstrate effective communication strategy implementation if he/she has only been trained to remember and identify them?

An additional limitation could be the training content used in this study. Communication was chosen as the content focus for training because it was thought to be a universally important and useful skill. The logic in choosing communication was that all college student participants should care about improving their communication skill regardless of major or personal interests. In hindsight however, communication might also be viewed as universally tangential. In other words, there is a possibility that different results would have been obtained if training content had been more "job related;" for example, providing training content covering the use of SPSS for psychology majors.

Another limitation to the present study was discussed in a response article to Kraiger (2008b). Bedwell and Salas (2008) pointed out the importance of learner-learner interactions for successful learning and suggested that perhaps Kraiger (2008b) did not place enough emphasis on the importance of the instructor in facilitating learner-learner interactions. Their contention is that although learner-learner interaction can occur in computer mediated training environments; some research exists to suggest that creating a sense of community among trainees may be easier in face-to-face situations. It is that sense of community, according to Bedwell and Salas that enables learner-learner interaction to occur. Furthermore, instructors in face-to-face training situations are at an advantage to create this sense of community. For example, Bedwell and Salas cited studies showing that non-verbal cues, important in the creation of trust among learners, are not transmitted in computer-based training (Rocco, 1998) and that trust in distributed teams actually decreases overtime compared face-to-face teams in which trust increases (Aubert & Kelsey, 2003). Additionally, Bedwell and Salas stressed the importance of the active role of the instructor in creating effective learner-learner interactions in terms of learner control. They agreed with Arbaugh's (2008) contention that the social presence of an instructor is not sufficient, but that a teaching presence (including demonstrating skill, modeling attitudes or values, counseling, supporting, advising, and chastising learners) is required to encourage effective use of learner control in learner-learner interactions.

The present study may have been limited by the issues raised by Bedwell and Salas (2008). More specifically, it may have been limited both by its use of computer-mediated instruction and its relatively trivial instructor role. Perhaps the combination of commuter-mediated instruction and the short duration of training contributed to a poor sense of community among trainees and thus resulted in ineffective learner-learner interactions. Furthermore, the

study's low levels of learner control and the relatively passive role of the instructors may have exacerbated the problem. If indeed, effective leaner-learner interaction was not achieved, then it is unlikely that a true third generation training condition was created.

Future studies might seek to extend this research to organizational settings. Much has already been said about the limitations of the current study in relation to its generalizability to real world work settings. However, it is possible that a similar study conducted with a sample of actual employees would yield more informative results. Furthermore, future research would benefit from examining the application of different types of training content to the third generation approach to training design. For example, due to their social nature, training topics related to management, and conflict resolution might be particularly well suited for third generation training. Another avenue for future research might involve examining trainee reactions as a dependent variable. Understanding how the different training conditions impact the various dimensions of trainee reactions could provide researchers and practitioners with useful information for the development of future training research paradigms and interventions. For example, knowing that a third generation approach results in a higher average "interest" rating on the reaction measure could eventually lead to an understanding of the instructional methods of third generation training that have the greatest impact on trainee interest. In turn, this would provide support for the integration of such instructional methods into other training interventions. Alternatively, using near transfer, far transfer, and recall to predict reaction scores might shed light on other factors (e.g. training performance etc.) that impact trainee reactions. For example, trainees that perform better on recall might respond more positively to the item regarding the ease of "following the material" compared to those who performed better on the far

transfer measure. Knowing this could help researchers and practitioners better understand the processes underlying trainee reactions.

Next, future research might benefit from including a measure of personality. It could be argued that both the third generation training condition and the eventual transfer of communication skills rely on the personality characteristics of extroversion and openness to experience. For example, it is easy to imagine an extroverted individual performing more of the far transfer tasks (e.g. "I have tried to provide feedback to others about their communication") compared to his/her less extroverted counterpart. Thus, including personality dimensions as covariates might help clarify the relationships of interest. Future studies on this topic might also seek to measure change over time. Research has shown that while more complex training like the third generation approach used here can result in improved performance and transfer after a period of time, trainees often exhibit poor performance early on (Schmidt & Bjork, 1992). It could be that the time period required for trainees to process and implement what they learned in the third generation condition was not long enough in in the present study (2 weeks). Tracking changes in communication skill performance over time may reveal transfer effects that were missed.

Another avenue for future research might involve a closer examination of the dependent variables in terms of the variance. Alliger and Katzman (1997)(CITAION) noted that training can be evaluated in many ways one of which is to examine the variance of the dependent variables following training. While a change in the mean score on the dependent variable indicates an overall mean improvement, a change in the variance of that dependent measure can be an indication of improvement as well. For example, a smaller variance can indicate that trainees on the lower end of the distribution are now performing closer to the mean. So although

the overall mean performance of trainees has not changed one could say that the competence of the overall group of trainees has improved. In the present study, the variance for recall, near transfer, and Reaction 1 were substantially smaller in the third generation condition than the first generation condition, indicating an interesting topic for future research.

Finally, future research should seek to identify the relative importance of the different instructional methods in creating the conditions of third generation training. Such an understanding would help to simplify third generation research and would help practitioners make cost effective decisions concerning the design of third generation trainings. Furthermore, it is important to gain a better understanding of the optimal combinations of these instructional methods for different training content topics. For example, it could be that adaptive guidance and reflection/metacognition, is most effective for training topics related to more concrete reproducible skills while collaborative learning and negotiation of meaning are most effective for abstract, complex training topics.

REFERENCES

Aguinis, H., & Kraiger, K. (2009). Benefits of training and development for individuals and teams, organizations, and society. *Annual Review of Psychology, 60,* 451-74.

Alavi, M. (1994). Computer-mediated collaborative learning: An empirical evaluation. *MIS Quarterly,* 18, 159-174.

Alliger, G. M., Katzman, S. (1997). Reconsidering training evaluation: Heterogeneity of variance as a training effect. In Ford J. K., Kozlowski S. W. J., Kraiger, K., Salas, E., Rachout, M. (Eds.), *Improving training effectiveness in work organizations* (pp. 223-246). Mahwah, NJ: Erlbaum

Alliger, G. M., Tannenbaum, S. I., Bennett JR., W., Traver, H., & Shotland, A. (1997). A meta-analysis of the relations among training criteria. *Personnel Psychology, 50*(2), 341-358.

Arbaugh, J. B. (2008). Instructors as facilitators of learner-learner interaction in third-generation learning environments. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 1,* 486-489.

Arbaugh, J. B. (2001). How instructor immediacy behaviors affect student satisfaction and learning in web-based courses. *Business Communication Quarterly, 64*(4), 42-54.

Aubert, B. A., & Kelsey, B. L. (2003). Further understanding of trust and performance in virtual teams. *Small Group Research, 34,* 575-618.

Axtell, C. M., Maitlis, S., & Yearta, S. (1997). Predicting immediate and longer-term transfer of training. *Personnel Review, 26,* 201-213.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191-215.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, N.J.: Prentice-Hall.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37,* 122–147.

Barber, S.J., Rajaram, S., & Aron, A. (2010). When two is too many: Collaborative encoding impairs memory. *Memory & Cognition, 38*, 255–264.

Barkley, E., Cross, P., & Major, C. (2005). *Collaborative learning techniques* (pp. 3-25). San Francisco, CA: Jossey-Bass.

Baron, R., & Gideon, M. (2000). Beyond social capital: How social skills can enhance entrepreneurs' success. *Academy of Management, 14*, 106-116.

Basden, B.H., Basden, D.R., Bryner, S., & Thomas, R.L. (1997). A comparison of group and individual remembering: Does collaboration disrupt retrieval strategies? *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23*, 1176–1191.

Bates, R. A., Holton, E. F. III., Seyler, D. L., & Carvalho, M. A. (2000). The role of interpersonal factors in the application of computer-based training in an industrial setting. *Human Resource Development International*, *3*, 19–42.

Bedwell, W. L., & Salas, E. (2008). If you build it, will they interact? The importance of the instructor. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 1*, 491-493.

Bell, B. S., & Kozlowski, S. J. (2002). Adaptive guidance: Enhancing self-regulation, knowledge, and performance in technology based training. Personnel Psychology, 55, 267-306.

Bikson, T. K., & Eveland, J. D. (1990). The interplay of workgroup structures and computer support. In J. Galagher, R. Kraut, & C. Egido, C. (Eds.), *Intellectual teamwork* (pp.243-290). Norwood, NJ: Erlbaum.

Blumer, M. G. (1979). *Principles of statistics*. Mineola, NY: Dover.

Brown, A. L., Bransford J. D., Ferrara R. A., & Campione J. C. (1983). Learning, remembering, and understanding. In J.H. Flavell & E.M. Markman (Eds.), *Handbook of child psychology* (4th ed.). (Vol. 3, pp. 77-166). New York: Wiley.

Brown, K. G. (2005). An examination of the structure and nomological network of trainee reactions: A closer look at "smile sheets". *Journal of Applied Psychology*, 90, 991-1001.

Brown, K. G. (2001). Using computers to deliver training: Which employees learn and why? *Personnel Psychology, 54,* 271-296.

Bruner, J. (1990). *Acts of meaning*. Cambridge, MA: Harvard University Press.

Catalano, J. F. & Kleiner, B. M. (1984). Distant transfer in coincident timing as a function of variability of practice. *Perceptual and Motor Skills, 58,* 851-856.

Chiaburu, D. S., & Lindsay, D. R. (2008). Can do or will do? The importance of self-efficacy and instrumentality for training transfer. *Human Resource Development International, 11*, 199-206.

Christophel, D. M. (1990). The relationships among teacher immediacy behaviors, student motivation, and learning. *Communication Education, 39*, 323-340.

Corbalan, G., Kester, L., & van Merriënboer, J. J. G. (2008). Selecting learning tasks: Effects of adaptation and shared control on learning efficiency and task involvement. *Contemporary Educational Psychology, 33,* 733-756.

Corbalan, G., Kester, L., & Van Merriënboer, J .J. G. (2006). Towards a personalized task selection model with shared instructional control. *Instructional Science, 34*, 399-342.

Crowley, R. S., & Medvedeva, O. (2006). An intelligent tutoring system for visual classification problem solving. *Artificial Intelligence in Medicine, 36*, 85–117.

CTAT Cognitive Tutor Authoring Tools. (n.d.). Retrieved March 30, 2011, from http://ctat.pact.cs.cmu.edu/ index.php?id=fraction-addition.

DeRouin, R.R., Fritzsche, B.A., & Salas, E. (2004). Optimizing e-learning: Research-based guidelines for learner-controlled training. Human Resource Management, 43, 147–162.

Dubrovsky, V. J., Kiesler, S., & Sethna, B. N. (1991). The equalization phenomenon: Status effects in computer-mediated and face-to-face decision making groups. Human-Computer Interaction, 6, 119-146.

Duffy, J. L., Roehler, M., Meloth, M., Vavrus, L., Book, C., Putnam, J., et al. (1986). The relationship between explicit verbal explanation during reading skill instruction and student awareness and achievement: A study of reading teacher effects. *Reading Research Quarterly, 21,* 237-252.

Earley, P. C., Connolly, T, & Ekegren, G. (1989). Goals, strategy development, and task performance: Some limits on the efficacy of goal setting. *Journal of Applied Psychology, 74*, 24-33.

Ford, J., Smith, E. M., Weissbein, D. A., Gully, S. M., & Salas, E. (1998). Relationships of goal orientation, metacognitive activity, and practice strategies with learning outcomes and transfer. Journal of Applied Psychology, 83, 218-233.

Ford, J., Quiñones, M. A., Sego, D. J., & Sorra, J. (1992). Factors affecting the opportunity to perform trained tasks on the job. *Personnel Psychology, 45,* 511-527.

Friend, C. L., & Cole, C. L (1990). Learner control in computer-based instruction: A current literature review. *Educational Technology,* 20, 47-49.

Gagne´, R. M., Briggs, L. J., & Wagner, W. W. (1992*). Principles of instructional design.* New York: Harcourt Brace Jovanovich.

Gegenfurtner, A., Veermans, K., Festner, D., & Gruber, H. (2009). Motivation to transfer training: An integrative literature review. *Human Resource Development Review, 8,* 403–423.

Goldstein, I. L., & Ford, J. K. (2002). *Training in organizations: Needs assessment, development, and evaluation* (4th ed.). Belmont, CA: Wadsworth.

Goldstein, A. P., & Sorcher, M. (1974). *Changing supervisory behavior*. New York: Pergamon.

Hertzog, C., & Dunlosky, J. (2004). Aging, metacognition, and cognitive control. In K. W. Spence (Ed.), *The psychology of learning and motivation: Advances in research and theory, 45* (pp. 215-251). San Diego, CA: Elsevier Academic Press.

Hiltz, S. R. (1994). *The virtual classroom: Learning without limits via computer networks*. Norwood, NJ: Ablex.

Holladay, C. L., & Quiñones , M. A. (2003) Practice variability and transfer of training: The role of self-efficacy generality. *Journal of Applied Psychology, 88*, 1094-1103.

Koedinger, K. R., Anderson, J. R., Hadley, W. H., & Mark, M. A. (1997). Intelligent tutoring goes to school in the big city. *International Journal of Artificial Intelligence in Education, 8*, 30-43.

Katz, S. (1995). Identifying the support needed in computer-supported collaborative elearning systems. In the Proceedings for Computer Support for Collaborative Learning (CSCL 95).

Kraiger, K. (2008a). Third generation instructional models: More about guiding development and design than selecting training methods. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 1*, 500-506.

Kraiger, K. (2008b). Transforming our models of learning and development: Web-based instruction as enabler of third-generation instruction. *Industrial and Organizational Psychology, 1*, 454-467.

Kraiger, K., & Ford, J. K. (2006). The expanding role of workplace training: Themes and trends influencing training research and practice. In L. L. Koppes (Ed.), *Historical perspectives in industrial and organizational psychology* (pp. 281-309). Mahwah, NJ: Erlbaum.

Kraiger, K., & Jerden, E. (2007). A meta-analytic investigation of learner control: Old findings and new directions. In S. M. Fiore & E. Salas (Eds.), *Toward a science of distributed learning and training* (pp. 65-90). Washington, DC: American Psychological Association.

Kucan, L., & Beck, I. L. (1997). Thinking aloud and reading comprehension research: Inquiry, instruction, and social interaction. *Review of Educational Research, 67*, 271-299.

Laker, D. R. (1990). Dual dimensionality of training transfer. *Human Resource Development Quarterly, 1*, 209–235.

Latham, G. P., & Saari, L. M. (1979). Application of social-learning theory to training supervisors through behavioral modeling. *Journal of Applied Psychology, 64*, 239-246.

Livingston, J. A. (1997). Metacognition: An overview. Retrieved April 10, 2011, from http://gse.buffalo.edu/fas/shuell/cep564/Metacog.htm.

Machin, M. A., & Fogarty, G. J. (2004). Assessing the antecedents of transfer intentions in a training context. *International Journal of Training and Development, 8*, 222-236.

Mager, R. (1962). *Preparing instructional objectives.* San Francisco: Fearon.

McGehee, W., & Thayer, P. W. (1961). *Training in business and industry*. New York: Wiley.

McGuire, T. W., Kiesler, S., & Siegel, J. (1987). Group and computer-mediated discussion effects in risk decision making. *Journal of Personality and Social Psychology, 52,* 917-930.

Menzel, K. E., & Carrell, L. J. (1999). The impact of gender and immediacy on willingness to talk and perceived learning. *Communication Education, 48,* 31-40.

Moore, M. G. (1989). Three types of interaction. *American Journal of Distance Education, 3,* 1-6.

Morgeson, F. P., Reider, M. H., & Campion, M. A. (2005). Selecting individuals in team settings: The importance of social skills, personality characteristics, and teamwork knowledge. *Personnel Psychology, 58,* 583-611.

Mumford, M. D., Peterson, N. G., & Childs, R. A. (1999). Basic and cross-functional skills. In N. G. Peterson, M. D. Mumford, W. C., Borman, P. R. Jeanneret, & E. A. Fleishman (Eds.), *An occupational information system for the 21st century: The development of O*Net* (pp. 49-69). Washington, DC: American Psychological Association.

Nichols, J. D. (1996). The effects of cooperative learning on student achievement and motivation in a high school geometry class. *Contemporary Educational Psychology, 21,* 467-476.

Noe, R. A. (1986). Trainees' attributes and attitudes: Neglected influences on training effectiveness. *Academy of Management Review, 11,* 736–749.

Palinscar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual Review of Psychology, 49,* 345–375.

Phillips, G. M., Santoro, G. M., & Kuehn, S. A. (1988). The use of computer-mediated communication in training students in group problem-solving and decision-making techniques. *The American Journal of Distance Education, 2,* 38-51.

Psotka, J., & Mutter, S. A. (1988). *Intelligent tutoring systems: Lessons learned*. Hillsdale, NJ: Erlbaum.

Rajaram, S. (2011). Collaboration both hurts and helps memory: a cognitive perspective. *Current Directions in Psychological Science, 20*, 76-81.

Rajaram, S., & Pereira-Pasarin, L.P. (2010). Collaborative memory: Cognitive research and theory. *Perspectives on Psychological Science, 5*, 649–663.

Reflection. (20011). In *Merriam-Webster Online Dictionary*. Retrieved March 30, 2011, from http://www.merriam-webster.com/dictionary/reflection.

Rocco, E. (1998). Trust breaks down in electronic contexts but can be repaired by some initial face-to-face contact. In *CHI 1998 conference proceedings* (pp. 496-502). New York: ACM Press.

Roberts, T. (2005). *Computer-supported collaborative learning in higher education*. Hershey, PA: Idea Group Publishing.

Salas, E., & Cannon-Bowers, J. A. (2001). The science of training: A decade of progress. *Annual Review of Psychology, 52*, 471-499.

Scardamalia, M., & Bereiter, C. (1989). Intentional learning as a goal of instruction. In L. B. Resnick (Ed.), *Knowing, learning, and instruction* (pp. 361–392). Hillsdale, NJ: Erlbaum.

Schmidt, A. M., & Ford, J. (2003). Learning within a learner control training environment: The interactive effects of goal orientation and metacognitive instruction on learning outcomes. Personnel Psychology, 56, 405-429.

Schmidt, R. A., & Bjork, R. A. (1992). New conceptualizations of practice: Common principles in three paradigms suggest new concepts for training. *Psychological Science, 3*, 207-217.

Sears, D. O. (1986). College sophomores in the laboratory: Influences of a narrow data base on social psychology's view of human nature. *Journal of Personality and Social Psychology, 51*, 515-530.

Seibert, S. E., Kraimer, M. L., & Liden, R. C. (2001). A social theory of career success. *Academy of Management Journal*, *44*, 219-237.

Sharan, S., & Shaulov, A. (1990). Cooperative learning, motivation to learn, and academic achievement. In S. Sharan (Ed.), *Cooperative learning: Theory and research* (pp. 173-202). New York: Praege.

Skinner, B. F. (1960). Teaching machines. *The Review of Economics and Statistics, 42*, 189-191.

Sproull, L., & Kiesler, S. (1986). Reducing social context cues: electronic mail in organizational communication. Management Science, 32, 1492-1512.

Stacey, E. (1999). Collaborative learning in an online environment. *Journal of Distance Education, 14*(2), 14-33.

Tabachnick, B. G. & Fidell, L. S. (2009). *Using multivariate statistics.* Boston MA: Pearson.

Trent, S. C., Artiles, A. J., & Englert, C. S. (1998). From deficit thinking to social constructivism: A review of theory, research, and practice in special education. *Review of Research in Education, 23*, 277-307.

Weldon, M.S., & Bellinger, K.D. (1997). Collective memory: Collaborative and individual processes in remembering. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23*, 1160–1175.

Wonderlic, Inc. (2011). *Wonderlic Cognitive Ability Pretest*. Retrieved August 2, 2011, from http://www.wonderlic.com/assessments/ability/cognitive-ability-tests/cognitive-ability-pretest

Woo, Y., Reeves, T. C. (2007). Meaningful interaction in web-based learning: A social constructivist interpretation. *Internet and Higher Education, 10,* 15-25.

Zigurs, I., Poole, M. S., & DeSanctis, G. L. (1988). A Study of influence in computer-mediated group decision making. *MIS Quarterly, 12,* 625-644.

APPENDIX A

One-way Communication Task

One participant is randomly chosen and assigned the part of "demonstrator" while all others are given two sheets of paper and instructed (by the training instructor) to label one "diagram I" and another "diagram II". The instructor then explains that the demonstrator will give them directions for drawing the series of squares (Shown below). Participants are instructed to draw the squares exactly as the demonstrator tells them, on the paper labeled Diagram I. Participants are instructed to neither ask question nor give any form of response. Next, the instructor asks the demonstrator to examine the arrangement of squares in diagram I for 30 seconds.

Once the demonstrator has examined the arrangement of squares for two minutes the instructor asks the demonstrator to turn his/her back to the group. The instructor then asks the demonstrator to proceed with the description, reminding him/her to tell the group what to draw as quickly and accurately as possible. The instructor again reminds all participants not to ask questions or give responses. The instructor records the time it takes the demonstrator to complete his/her instructions in Table 6 (shown below) under diagram I. Next, each participant is asked to estimate the number of squares he/she has drawn correctly in relation to the other squares. These estimates are then recorded in Table 4.

Two-way Communication Task

Participants are instructed to take out the papers they labeled Diagram II. The demonstrator is asked to face the group and examine the arrangement of squares in Diagram II for 30 seconds. Next, participants are told that they are allowed to ask and answer questions during the exercise. The demonstrator is again reminded to tell participants what to draw as

quickly and as accurately as possible keeping in mind that he/she can now ask and respond to questions. The instructor records the time it takes the demonstrator to complete his/her instructions in Table 6 under diagram II. Next, the instructor asks each participant to estimate the number of squares he/she has drawn correctly. These estimates are then recorded in Table 5.

The instructor then uses tables 4 and 5 to calculate the average estimated accuracy for both Diagram I and Diagram II. This number is then posted in Table 6 next to "Estimated average". Next, the instructor shows the participants the actual diagrams for the two sets of squares. Each participant is asked to count the number of squares he/she has drawn correctly on each diagram. In the last columns of Tables 4 and 5, the instructor records the number of squares the participants have drawn correctly for each diagram. From this data, the instructor determines the mean for diagrams I and II and enters these in Table 6.

Finally, the instructor leads a short discussion of the results in terms of time, accuracy, and level of confidence, between the two forms of communication, stressing the importance of two-way communications. Following this discussion the instructor asks all trainees to think about the various barriers to effective communication that can occur when speaking with others. Trainees are encouraged to identify the barrier and explain to fellow trainees why this is a barrier to effective communication. Next, trainees are encouraged to identify the different strategies for effective communication and explain to their fellow trainees why that strategy might result in more effective communication.

Note that the communication tasks for the First and Third-generation trainings will differ slightly due to the use of computer-mediated interaction in the Third-generation condition. Although the tasks will be structured the same way, there will be no need for the demonstrator to turn away from the participants since trainees in the Third-generation conditions will not be able

to see each other (they will be interacting via chat only). Additionally, all demonstrator descriptions, participant questions, and group discussions in the Third-generation approach will occur through the chat function only. Finally, participants in the third generation condition will not be presented with tables 4, 5, or 6. Instead they will be told how long it took them to complete diagram I verses diagram II and they will be asked to think about which diagram they felt more confident drawing and which was easier to draw and why. They will be told that diagram I represents one-way communication while diagram II represents two-way communication.

Table 4 (For diagram I)

Number Correct	Estimate	Actual

Table 5 (For diagram II)

Number Correct	Estimate	Actual

Table 6 (Summary)

	Diagram I	Diagram II
Time Elapsed		
Estimated Mean		
Actual Mean		

Diagram I

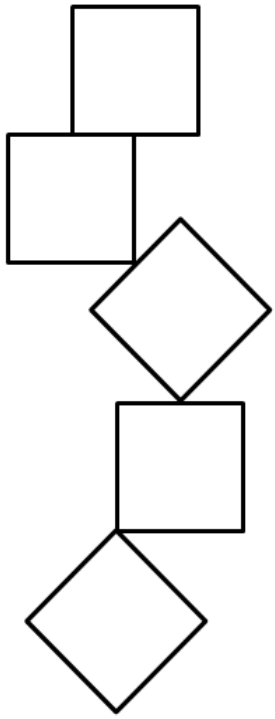
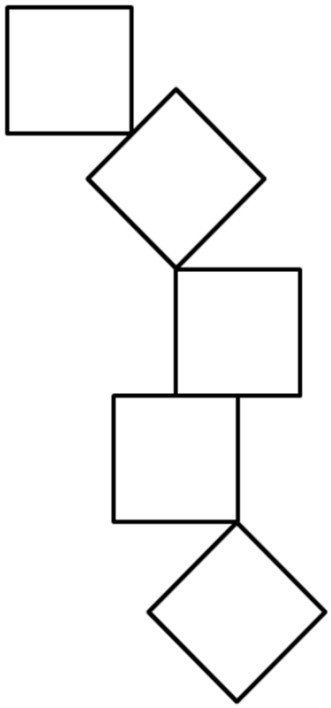


Diagram II



APPENDIX B

Survey 1 (Demographics and controls)

Please answer each of the following questions.

1. Age: _____
2. Gender: 1 = Male, 2 = Female
3. Race: 1 = Asian, 2 = Black or African American, 3 = Hispanic or Latino, 4 = Native American, 5 = White (Caucasian), 6 = Other
4. Years of college: 1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = more than 4
5. Highest degree obtained: 1 = High school diploma, 2 = Associates degree, 3 = Bachelor's degree, 4 = Master's degree, Ph.D.
6. Number of siblings: _____
7. Are you currently employed? 1 = Yes, 2 = No
    - If yes, how many hours per week do you currently work? _____
    - If not currently employed, have you been employed in the last 12 months? 1 = Yes, 2 = No
    - If yes, how many hours per week did you work? _____
8. Have you ever taken a class on communication during high school or college? 1 = Yes, 2 = No.
    - If yes, what was your grade? 1 = F, 2 = D, 3 = C, 4 = B, 5 = A
9. If I had to rate my interest in the training topic (communication) on a scale from 1 to 5, with 1 = not interested at all and 5 = extremely interested, I would score _____
10. If I had to rate my communication ability on a scale from 1 to 5, with 1 = extremely low ability and 5 = extremely high ability, I would score _____
11. If I had to rate my social skills on a scale from 1 to 5, with 1 = extremely poor social skills and 5 = extraordinary social skills, I would score _____

APPENDIX C

Immediately following training

Survey 2 (Reaction to training)

Please use the following scale to indicate your agreement with the items below.

1 = Strongly Disagree 2 = Disagree 3 = Slightly Disagree 4 = Slightly Agree
5 = Agree 6 = Strongly Agree

1. This training course gave me new knowledge about communication.
2. This training course was effective.
3. This course has peaked my interest in communication.
4. This training course made learning the material enjoyable.
5. I had a tough time following the material.
6. The training course grabbed my attention.
7. This training course allowed me to learn the material with ease.
8. I am very satisfied with this training course.
9. I would likely recommend this training course to my peers.
10. I will try applying what I learned about effective communication in the near future.
11. I felt lower in status compared to the instructor.
12. I felt lower in status compared to my fellow trainees.
13. During the training I felt personally accountable for my performance.
14. During the training I felt accountable for my group's performance.*
15. During the training I felt that the contributions of each group member were important for the success of the group.*
16. The comments of my fellow trainees contributed to my learning.
17. This training gave me an opportunity to improve my social skills.
18. The discussion portion of the training allowed our training group to come to a shared understanding of the training concepts.*
19. I had had an opportunity to explain my thoughts to others.

Note: * indicates an item present for only the third generation training group

Survey 3 (Free recall of training content)

Barriers to effective communication:

Please list all of the barriers to effective communication you can remember in the spaces below. Please try your best to summarize the barrier in a single short statement as similar as possible to those you were shown at the end of your training. If you are unable to recall the exact wording of the barrier, do your best to clearly identify the barrier you are referring to.

1._____

2._____

3._____

4._____

5._____

6._____

7._____

8._____

9._____

10._____

11._____

12._____

13._____

14._____

15._____

16._____

17._____

18._____

19._____

20._____

Strategies to effective communication:

Please list all of the strategies for effective communication you can remember in the spaces below. Please try your best to summarize the strategy in a single short statement as similar as possible to those you were shown at the end of your training. If you are unable to recall the exact wording of the strategy, do your best to clearly identify the strategy you are referring to.

1._____

2._____

3._____

4._____

5._____

6._____

7._____

8._____

9._____

10._____

11._____

12._____

13._____

14._____

15._____

16._____

17._____

18._____

19._____

20._____

21._____

22._____

23._____

24._____

25._____

Survey 4 (video questions)

Video 1: Barriers

In the spaces below please list all of the barriers to effective communication that were displayed in the video clip you just watched. Note that the number of spaces does not necessarily correspond to the number of barriers displayed in the video. Please try your best to summarize the barrier in a single short statement as similar as possible to those you were shown at the end of your training. If you are unable to recall the exact wording of the barrier, do your best to clearly identify the barrier you are referring to.

1._____

2._____

3._____

4._____

5._____

6._____

7._____

8._____

Video 2: Strategies

In the spaces below please list all of the strategies for effective communication that were displayed in the video clip you just watched. Note that the number of spaces does not necessarily correspond to the number of strategies displayed in the video. Please try your best to summarize the strategy in a single short statement as similar as possible to those you were shown at the end of your training. If you are unable to recall the exact wording of the strategy, do your best to clearly identify the strategy you are referring to.

1._____

2._____

3._____

4._____

5._____

6._____

7._____

8._____

Far Transfer Measure

Survey 5 (behavioral survey)

For each of the following items, think about your communication behaviors over the past two weeks (for example, with friends, at work, or in class). For each statement use the numbers to indicate how often you have engaged in that particular behavior during communication.

1 = Very infrequently 2 = Infrequently 3 = Sometimes 4 = Frequently 5 = Very Frequently

1.	I have sought to clearly define my terms	1	2	3	4	5
2.	I have asked additional questions to ensure I understand	1	2	3	4	5
3.	I have sought to say things multiple ways to ensure others fully understand me	1	2	3	4	5
4.	I have sought to use points of reference	1	2	3	4	5
5.	I have tried not to make assumptions about the message being communicated to me	1	2	3	4	5
6.	I have tried not to make assumptions about the person(s) I am communicating with	1	2	3	4	5
7.	I have tried to ensure that there is enough time to communicate effectively	1	2	3	4	5
8.	I have tried to provide feedback to others about their communication	1	2	3	4	5
9.	I have tried to solicit feedback from others about my communication	1	2	3	4	5
10.	I have made a conscious effort to provide others with accurate information during communication	1	2	3	4	5
11.	I have made a conscious effort to provide others with complete information during communication	1	2	3	4	5
12.	I have asked others to repeat thing to ensure I understand them correctly	1	2	3	4	5
13.	I have encouraged other to ask me questions	1	2	3	4	5
14.	I have sought to allow others to finish what they are saying before asking questions making comments , or replying to questions	1	2	3	4	5
15.	I have worked to ensure I have adequate time to communicate effectively	1	2	3	4	5
16.	I have worked to be objective by remembering I have my own set of pre conceptions, prejudices, past experiences and emotions that can impact objectivity.	1	2	3	4	5
17.	I have sought to clearly identify my objectives for communicating	1	2	3	4	5