Effects of Cooperative Learning on Performance, Attitude, and Group Behaviors in a Technical Team Environment

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The purpose of this study was to investigate the effects of cooperative learning strategies on performance, attitude toward working in teams, and group interaction behaviors in a technical training context. Participants were 274 engineering employees enrolled in a required training class that focused on communicating technical procedures in plant operations. Participants were divided into small groups and cooperative teams. Instruction was the same for all participants. Only the practice portion of the lesson reflected cooperative strategies versus no process direction. Results indicated that the practice conducted in a cooperative manner had a significant effect on performance and group behaviors. Participants in the cooperative teams performed better on the posttest, enjoyed working in teams, perceived more accomplishment, and displayed higher levels of social and cognitive interaction than participants who worked in unstructured small groups. Implications for integrating cooperative strategies into technical team training are provided.

☐ Since the early 1980s, much emphasis has been placed on the value of forming teams in the workplace and the role they play in increasing profits and competitiveness. Total Quality Management and other similar management philosophies in business, industry, and education point to team-based work environments as the success formula of the future (Dobyns & Crawford-Mason, 1991; Lawler, Mohrman, & Ledford, 1992). Although groups of employees who are content experts are being assigned to work in project teams, little training in team building or group process skills is provided (Decker, 1993).

In the rush of American business to move from environments where individuals work in isolation to groupings of employees, the terms *teams* and *small groups* are often used interchangeably. Salas, Dickinson, Converse, and Tannenbaum (1992) suggest that a small-group continuum exists. At one end of this continuum are loosely cohesive groups where members perform individual tasks and functions and coordinate only somewhat with the group. At the other end are highly structured, interdependent groups. A number of authors have suggested that highly structured, interdependent groups perform at high achievement levels and exhibit behaviors such as (a) a dynamic exchange of information and resources among members; (b) coordination of tasks, for example, active communication, supportive behavior; (c) constant adjustments to task demands; (d) some organization structuring of members; and (e) interdependency

among members (Dyer, 1984; Foushee & Leister, 1977; Larson & LaFasto, 1989; Morgan, Glickman, Woodard, Blaiwes, & Salas, 1976; Salas et al., 1992). Although research has been conducted in group dynamics and adult learning describing the role of individual members in work groups and the effectiveness of work groups in business and industry (Cannon-Bowers, Oser, & Flanagan, 1992), it is only recently that research has been conducted on how group dynamics, adult learning, and work group effectiveness affect team learning (Allen, 1984; Ancona & Caldwell, 1990; Cicourel, 1990).

While American business and industry has struggled with how to implement effective team-based approaches, research on team learning has been conducted in educational settings for many years. In the late 1800s, cooperative learning strategies were used extensively by Colonel Francis Parker in Quincy, Massachusetts and were later an integral part of Dewey's method of instruction (Dewey, 1916). Johnson and Johnson formed their cooperative learning center at the University of Minnesota in the early 1970s. According to Johnson and Johnson (1989), cooperative learning allows students to work together to increase performance and achieve shared goals. Cooperative learning is a highly structured group strategy that includes five elements:

1. positive interdependence to achieve a common goal
2. face-to-face promotive interaction
3. individual accountability
4. social skills
5. group self-assessment (Johnson & Johnson, 1989)

These elements are supported by an instructor/coach who acknowledges team and individual efforts and facilitates group interaction (Johnson, Johnson, & Smith, 1991a). Several reviews of research suggest that cooperative learning increases student achievement, productivity, time on task, transfer of learning and motivation (Johnson & Johnson, 1989; Sharan, 1980; Slavin, 1990).

These educational outcomes are similar to those desired in the workplace. However, a search of Educational Resources Information Center (ERIC) revealed that there has been no reported research conducted to determine the effect of training employee teams using cooperative learning strategies that include the elements listed above. It is likely that workplace teams who are trained using cooperative learning would accomplish more than teams trained using less structured group-based approaches. This might be especially true in a highly technical environment where safety standards are monitored by regulatory government agencies. Engineering professionals in these environments are particularly prone to highly detailed, task structured, and individualistic work. Such is the case for the company and participants in this study.

For safety reasons, an accrediting federal agency issued cautionary warnings recommending that teamwork be more highly integrated into work tasks and procedures. The company's response was to modify the lesson plan for the mandatory quarterly training course required of all engineering personnel. Practice exercises for this course were changed from individual work to loosely cohesive small group work. One year after this strategy was implemented, the accrediting federal agency again issued a cautionary warning that teamwork had not improved the public safety issues involved and recommended that increased teamwork needed to be demonstrated. The agency emphasized that training to perform in teams in a less structured group-based approach did not necessarily result in the behaviors and task performance outcomes exhibited by highly effective teams.

The nature of work tasks of teams in this study required task specialization where individual members were responsible for a subset task of the total assignment and also for the collective knowledge of the project as a whole. These requirements led to the decision to use the jigsaw cooperative learning strategy first described by Aronson, Blaney, Stephan, Sikes, and Snapp (1978). Although other cooperative learning methods such as Student Teams-Achievement Divisions, Teams-Games-

Tournament, Team Assisted Individualization (Slavin, 1991) or Focused Discussion Pairs (Johnson, Johnson, & Smith, 1991b) were examined for appropriateness, Slavin's Jigsaw II (1991) method based on Aronson et al. (1978) was selected. The Jigsaw II method assigns each team member to read a common narrative with each member assigned a specific topic or section. Team members have specific roles and are responsible for teaching all team members their assigned content (Slavin, 1991).

The purpose of the current study was to determine the effect of implementing a more structured, cooperative learning strategy on performance, attitude, and group behaviors in this technical training setting. Engineers who were required to work in teams were trained using either the structured cooperative learning approach or the less structured, small-group approach currently being used by the company. It was predicted that the groups who used the cooperative learning strategy would demonstrate higher performance, better attitudes, and more interactive group behaviors than those who used the less structured approach.

METHOD

Participants

Participants were 274 male engineering employees of a large utility company in the southwestern United States. All participants were enrolled in one of ten sections of a required training course. Participants in the study were typical of engineering professionals in education and socioeconomic status.

Procedures

This study was implemented in ten sections of a required training course focusing on technical procedures in plant operations. The ten sections were scheduled over the course of three months. Two weeks prior to the study, participants were assigned to sections by their supervisors to accommodate work schedules. An introductory letter from the supervisor of technical training was sent to all participants. The letter announced that the required training session would have a different format from previous training sessions. After participants were scheduled into the training sections, the sections were randomly assigned to five treatment and five control groups.

One instructor taught all participants in both the structured cooperative classes (treatment group) and the less structured, small group classes (control group). The instructor was asked to read three sections in the ERIC report, *Cooperative Learning: Increasing College Faculty Instructional Productivity* (Johnson et al., 1991b) as background information. The sections of the report were those describing the basic elements of cooperative learning, review of the research, and the instructor's role in cooperative learning. The researcher discussed this information with the instructor in preparation for drafting an outline of the lesson plan for both the control and treatment groups. At the instructor's request, a lesson plan on active listening was scripted by the researcher. The instructor and researcher incorporated cooperative learning strategies with the technical content. Finally, the active listening and technical content were combined to produce a printed instructional support document. All participants were provided with the same instructional content and practice exercises. The difference between the control and treatment groups was limited to the structure of the practice sessions.

The original classroom seating arrangement was retained for both the control and treatment groups. This consisted of six tables with six chairs per table arranged to face the front of the room. A lectern, overhead projector, and screen were located at the front of the room. There was no assigned seating in class. Upon arrival, participants sat wherever they chose. Four workbooks were placed at each seating position.

The instructor began all classes with a brief introduction stating that, in addition to the topic information of the class, there would be an emphasis on team work during

the practice exercises. All participants were then presented with the instructional objectives for the class covering both active listening and the technical content. Prior to introducing the technical content, 30 minutes were devoted to information and practice of active listening skills to facilitate working in teams. Working from the printed instructional support document, the instructor reviewed a communication model presenting the differences that can occur between an intended message and a received one (Stech & Ratliffe, 1985). Overheads were used to graphically display the model. A handout on active listening skills was distributed to all participants followed by class discussion. After the instruction, 15 minutes were devoted to the practice of active listening. Each small group of six was told that they would be working as a team for the remainder of the class. Participants in the control group were given individual copies of the practice exercise and told to stay in their teams to discuss and complete the exercise. Participants in the treatment groups also remained in their teams; however, they were asked to move their chairs in order that face-to-face interaction could occur and to share one copy of the exercise. For both control and treatment groups, the instructor followed up with a brief feedback discussion.

After the active listening practice, the instructor began the technical-content portion of the class by reviewing the objectives and giving a brief overview of the six case studies found in a set of four workbooks. All teams were then asked to choose a case study. The teams worked through advance organizer questions which assisted them in analyzing the case situations and identifying the problems and/or causes. Given the engineering environment, the advance organizer questions focused on mechanical, electrical, and waste water systems as they apply to equipment and processes. Participants were asked to discuss solutions and/or problem-avoidance strategies. Answers to the organizer questions were presented to the entire class upon completion of the practice exercise time. To aid teams in presenting key concepts of their selected case study, advance organizer questions, blank overhead transparencies and pens were provided. Teams were given one hour to prepare for their presentations during which time one team from each class was selected at random to be videotaped to record team-member interactions.

The control group teams were given no instructions in regard to team member interactions nor were they asked to evaluate their team. The treatment group teams were instructed that each member would have a specific role and responsibility. The team was to select: (a) a spokesperson; (b) a recorder who would take notes as to how the group functioned as a team and how well they used active listening skills; (c) a question presenter who would paraphrase or interpret advance organizer questions during the presentation; (d) an overhead scriptor; and (e) a validator(s) who would verify answers to advance organizer questions. Treatment participants were informed that the information collected by the recorder would be used by the team after the presentations to evaluate how well their team used active listening skills and to identify one thing that would improve their teamwork in the future. They were also reminded that active listening is one of the many social skills needed to communicate effectively.

Upon completion of the presentations, treatment teams were again asked to convene for five minutes and evaluate their team interaction. Using the notes taken by the recorder as a reference, each team was told to: (a) discuss how well its members used active listening skills; and (b) identify one thing that would improve teamwork if the team was reassembled in the future. After five minutes, the instructor asked the spokespersons to report their team evaluations to the class.

At the end of the course, all participants completed a ten-item posttest over the technical content and a ten-question attitude questionnaire. At the conclusion of class, the posttest and attitude survey were collected by the instructor and given to the researcher for scoring. The videotape of the team was also given to the researcher.

Materials

Materials used in this study included a print-based instructional lesson, print-based instructional support materials and overheads for the instructor, a posttest, a postlesson attitude questionnaire, and an interaction criteria scoring sheet.

The print-based instructional lesson included four workbooks produced within the service organization, a listening skills practice exercise handout, and a handout describing team member roles and responsibilities for treatment group team members.

The first workbook contained the instructional objectives, active listening skills handout adapted from Tech and Ratliffe (1985), and advance organizer questions for each case study. Workbooks two, three, and four contained two case studies each. Each case study described an event in which a technical problem coupled with a performance technology deficiency caused a potentially dangerous situation.

The listening skills handout adapted from Stech and Ratliffe (1985) contained three sections: "Asking open-ended questions," "Paraphrasing and summarizing," and "Clarifying and confirming." The practice exercise, designed and developed by the researcher and instructor, consisted of a scenario describing a work situation in which a supervisor gave work direction to his team of four employees. Four discussion questions focusing on how well the supervisor and employees used active listening techniques followed the scenario description.

The team-member roles and responsibilities handout was based on Slavin's Jigsaw II method (1991). The handout described the roles of team members as spokesperson, overhead scriptor, question presenter, recorder and validator(s) who was/were responsible for verifying the accuracy of the answers to the advance organizer questions.

The print-based instructional support materials for the course instructor included a script detailing the content and sequence of the active listening portion of the lesson and a series of overhead transparencies. The script described the responsibility of team members in sending and receiving information and more specifically, messages. There was emphasis on the interpretation of received messages and how this affects the performance of a team task and the functioning of the team as a unit. A series of overhead transparencies that presented the team interaction objectives, communication model, and team evaluation questions used with the treatment groups accompanied the script.

Criterion Measures

The three criterion measures employed in this study were a posttest, an attitude survey, and group interaction behaviors.

The ten-item posttest was used to measure performance. Knowledge of the highly technical content was assessed using a variety of formats including true/false, multiple choice, fill-in, and short answer. Each item was worth ten points and an answer key was used to grade each test. Partial credit was given for items 3, 4, and 5 where multiple answers were required. Because of the technical nature of the content tested, only those answers designated on the answer key were accepted as correct. Both the posttest content and answer key were developed by the instructor in consultation with a group of subject matter experts. One person, unfamiliar with the content, scored all tests. The Kuder-Richardson-20 internal-consistency reliability estimate of the posttest was .92.

The attitude survey was a nine-item Likert-style survey. The items identified the degree to which each individual liked working in teams and how well his or her team functioned as a unit in regard to group strategies and active listening skills. Specifically, the nine items targeted satisfaction for working in groups, role of each member as it related to the success of the group, face-to-face interaction, contribution of each member to the presentation, enhancement of active listening as a social skill, functioning of group as a unit, effectiveness of training format, knowledge of common team goal, and group versus individual accom-

plishment. The Cronbach alpha internal-consistency reliability estimate of the attitude survey was .61.

Group interaction behaviors were identified by two reviewers while independently observing videotapes recorded during the sessions. One reviewer was "blind" with respect to knowing what groups received what treatments. The other reviewer did know which groups received what treatments. An interaction criteria scoring sheet based on codes developed by Trowbridge and Duran (1984) was used by the reviewers to document interactions as they were observed. The scoring sheet contained two columns: one entitled social codes and the other entitled cognitive codes (see Figure 1). The number of social and cognitive behaviors was totaled for each observer to determine the reliability of the independent observations. The inter-rater reliability was .95 for social behaviors and .91 for cognitive behaviors. A space for recording interaction occurrences accompanied each column.

Figure 1 ☐ Categories of social and cognitive interaction behavior. (Modified from Trowbridge & Duran, 1984.)

Social Codes:	*Cognitive Codes:*
approval, agrees with others	tells, directs
disagrees with others	asks for suggestions
encourages others	explains
gives help	asks a question
takes turns	responds to suggestions
gives or delegates tasks	interprets in own words
polls others, solicits	evaluates using criteria

Design and Data Analysis

A posttest-only control group design was used for this study. Analysis of variance (ANOVA) was used to test for differences between the treatment and control groups on posttest performance and for each item on the attitude survey. Group interaction behaviors were separated into social and cognitive behaviors. Multiple analysis of variance (MANOVA) was used to analyze the differences between groups for each set of behaviors. MANOVA was followed by univariate analyses on each social and cognitive behavior. Alpha level was set for .05 for all statistical tests.

RESULTS

Performance

Performance was measured with the 10-item, 100-point posttest. The posttest assessed technical knowledge presented in the case studies. ANOVA revealed that participants in the cooperative learning groups ($M = 85.73$, $SD = 12.77$) performed significantly better on the posttest than those in the control groups ($M = 82.33$, $SD = 13.82$) [$F(1,273) = 4.47$, $p < .05$].

Group Behaviors

Fourteen observable group behaviors were identified as either social or cognitive interactions and each set of behaviors was analyzed separately. Mean scores and standard deviations for social and cognitive behaviors are given in Tables 1 and 2.

MANOVA revealed a significant effect for overall social behaviors, $F(7,10) = 78.26$, $p < .05$. Treatment group participants interacted more than control group participants for five of the seven social behaviors. The treatment groups exhibited significantly more agreement than control groups, $F(1,7) = 62.06$, $p < .001$. Treatment group members also encouraged others significantly more often than control group members, $F(1,7) = 48.05$, $p < .001$. Next, treatment group members helped each other significantly more than the control group members, $F(1,7) = 6.42$, $p < .05$. The treatment groups also exhibited significantly more taking turns behavior than the control groups, $F(1,7) = 7.64$, $p < .01$. Finally, treatment group members solicited others for informa-

Table 1 ☐ Mean Scores and Standard Deviations for Observed Social Behaviors.

Behaviors		*Cooperative Groups*	*Small Groups*	*p*
Approval, agrees with others	*M*	6.80	.80	.00
	SD	1.32	.75	
Disapproval, disagrees with others	*M*	.20	.00	.35
	SD	.40	.00	
Encourages others	*M*	6.20	.40	.00
	SD	1.60	.49	
Gives help	*M*	4.60	1.20	.04
	SD	2.24	1.47	
Takes turns	*M*	4.00	.80	.03
	SD	2.10	.98	
Gives or delegates tasks	*M*	.80	.40	.39
	SD	.75	.49	
Polls others, solicits	*M*	9.00	.20	.00
	SD	1.41	.40	

Table 2 ☐ Mean Scores and Standard Deviations for Observed Cognitive Behaviors.

Behaviors		*Cooperative Groups*	*Small Groups*	*p*
Tells, directs	*M*	2.20	2.00	.81
	SD	1.47	.63	
Asks for suggestions	*M*	7.00	1.20	.00
	SD	1.41	1.47	
Responds to suggestions	*M*	7.20	1.80	.01
	SD	4.68	2.22	
Explains	*M*	5.20	1.00	.00
	SD	.75	.63	
Asks a question	*M*	7.20	1.00	.00
	SD	4.19	.63	
Interprets in own words	*M*	12.00	.80	.00
	SD	5.54	.75	
Evaluates using criteria	*M*	3.80	0.00	.00
	SD	.98	0.00	

tion and opinions significantly more than control group members, $F(1,7) = 143.40$, $p < .001$.

MANOVA also revealed a significant effect for overall cognitive behaviors [$F(7,10) = 114.64$, $p < .05$] with significant differences in six of the seven cognitive behaviors. The treatment group members asked for suggestions significantly more often than the control group members, $F(1,7) = 32.34$, $p < .001$. Coupled with asking for suggestions, treatment group members responded significantly more to suggestions than control group members, $F(1,7) = 12.78$, $p < .01$. Treatment group members explained how to do various procedures involved with tasks significantly more often than control group members, $F(1,7) = 73.50$, $p < .001$. Treatment group members asked more questions of each other than control group members, $F(1,7) = 33.71$, $p < .001$. Treatment group members also interpreted topics in their own words more than control group members, $F(1,7) = 18.33$, $p < .001$. Finally, treatment group members evaluated answers to the advance organizer questions using criteria significantly more than control group members, $F(1,7) = 60.16$, $p < .001$.

Table 3 ☐ Mean Scores and Standard Deviations on Attitude Survey

Items		*Cooperative Groups*	*Small Groups*	*p*
1. I enjoy working in groups to accomplish a task.	*M*	2.23	2.00	.00
	SD	.96	.82	
2. All members of my group were integral to the group's success.	*M*	1.98	1.89	.22
	SD	.89	.80	
3. The physical seating arrangement of my group contributed to positive interaction of all members.	*M*	2.96	2.89	.01
	SD	1.22	1.19	
4. Each member of my group contributed to the effectiveness of our presentation and success of the group.	*M*	2.01	2.03	.25
	SD	.86	.98	
5. Using active listening skills enhanced communication in my group.	*M*	2.22	2.13	.13
	SD	.91	.84	
6. My group could have functioned better.	*M*	2.38	2.44	.34
	SD	.81	.96	
7. I will be better able to function as a team member in the future after participating in this new training format.	*M*	2.84	2.76	.42
	SD	1.08	.91	
8. My group knew the goal of the group and understood its importance.	*M*	2.23	2.05	.05
	SD	.91	.71	
9. I think that we accomplished more as a group than we could have if we had worked individually.	*M*	2.27	2.05	.03
	SD	1.14	.98	

Attitude

Attitudes toward working in teams were measured with a nine-item, Likert-style survey. Mean scores and standard deviations for each item are provided in Table 3.

Results revealed significant differences on four of the nine items. The first two items referred to satisfaction and sense of accomplishment. Treatment group members experienced significantly more satisfaction than control group members as indicated by their response to the item, "I enjoy working in groups to accomplish a task," $F(1,187) = 7.47$, $p < .01$. The treatment group members perceived also a greater sense of accomplishment as suggested by their response to the item, "I think that we accomplished more as a group than we could have if we had worked individually on our assigned content," $F(1,187) = 4.33$, $p < .05$. The third item revealed that face-to-face seating was perceived by the treatment group to be more important in promoting interaction than it was by the control group as evidenced by the item, "The physical seating arrangements of my group contributed to the positive interaction of all members," $F(1,187) = 6.85$, $p < .05$. Significant differences were also found for importance of goal recognition as seen in the treatment and control group members' responses to the item, "My group knew the goal of the group and understood the importance," $F(1,187) = 3.71$, $p < .05$.

DISCUSSION

The purpose of this study was to determine the effect of cooperative learning strategies on performance, attitude, and group behaviors in a technical training setting. Engineers who were required to work in teams were trained using either cooperative learning or a less-structured, small-group approach.

As predicted, participants in the treatment groups performed better on the posttest than those in the control groups. These results are likely due to the highly structured nature of the cooperative strategy used by the treatment

groups. This strategy was designed to include all the elements necessary for successful cooperative learning groups (Aronson et al., 1978; Johnson & Johnson, 1989). Treatment group members were told to physically change their seating arrangement to accommodate face-to-face interaction, were each assigned a role and responsibility during training, and were given only one copy of the instructional materials. Treatment group members were also reminded to use active listening and were provided with the opportunity to conduct group self-assessment at the end of the class.

It is also likely that the treatment groups performed better than the control groups because of the nature of the interactions exhibited by each group. Participants who used the cooperative learning strategy during training exhibited significantly more social interactions such as helping, encouraging, agreeing, discussing, and sharing of materials. Treatment group members also demonstrated significantly more cognitive behaviors such as giving/responding to suggestions, asking questions, explaining procedures, and interpreting content.

Other researchers have found that group interaction behaviors are related to performance when cooperative learning is implemented in classrooms. Webb (1989) reported that the amount of help given or received by members of cooperative groups is positively related to achievement. King (1989) found that students in groups that discussed problem-solving strategies and asked questions learned more than students in groups that did not exhibit these behaviors. In addition, several researchers have found that students in cooperative groups who explain or summarize content during instruction perform better than those in groups who do not demonstrate these cognitive behaviors (Lambiotte et al., 1987; McDonald, Larson, Dansereau, & Spurlin, 1985; Sherman & Klein, 1994; Yager, Johnson & Johnson, 1985).

Analysis of the videotaped interactions verified that treatment groups did accomplish their tasks using the cooperative strategies. In all cases, treatment group members attended to task almost immediately. The leader facilitated the assignment of tasks needed to complete the exercise. Two of the treatment groups opted to work through all of the advance organizer questions together. This allowed for much discussion. The other three treatment groups agreed to assign each team member a certain number of questions. They worked individually and then returned to share their information and validate it with case study references. There seemed to be purpose and direction to treatment group activities as evidenced by supporting body language. Treatment group members leaned forward, nodded their heads affirmatively, and gestured to other members.

These behaviors were in contrast to those exhibited by control group members. In all cases, the control groups worked individually to answer the advance organizer questions and complete the exercise. At the beginning of the practice time, a natural leader emerged to facilitate the assignment of questions. Individuals in the control groups were asked to volunteer to answer one or more of the questions. If no one volunteered, the natural leader assigned the question to a group member. The overheads required for the presentation were passed from one individual to the next with no discussion as they completed their portions. The control groups appeared to be stifled by the seating arrangement; members displayed little body language that could be interpreted as contributing to supportive peer interaction. There was little planning or rehearsal for the class presentation; most control group members left the room for an early break.

While viewing the videotape of the treatment and control groups, an unexpected behavior was observed. Off-task conversation was noted in all of the control groups and a few of the treatment groups. There appeared to be more off-task conversation among control group members than treatment group members. Since this behavior was not included in the original behavior scale developed by Trowbridge and Duran (1984), it was not recorded. However, the nature of such off-task conversation may give insight into the interpersonal relationships of group members and should be explored in future research.

The current study does suggest that cooperative learning has a positive influence on attitudes in a training setting. Treatment group members indicated significantly more satisfaction and a sense of accomplishment than control group members. Treatment group members also had a more positive attitude toward both the goal of instruction and the seating arrangement used during training. These results are consistent with other studies indicating that cooperative learning has a strong influence on attitude and motivation in educational settings (Johnson & Johnson, 1989; Klein & Pridemore, 1992; Slavin, 1991).

This study has immediate and local implications. After reviewing the results of the current study and listening to trainee comments outside of class, the instructor in this study made two modifications to future training sessions. Members of classroom teams will be given assigned duties and roles and the classroom furniture will be rearranged to facilitate face-to-face interaction.

The current study also has implications to others who are responsible for designing training to promote team-based approaches. Results suggest that a highly structured, cooperative learning strategy can affect performance, attitude, and group interaction behaviors in a technical training environment. Results also imply that small-group strategies which include the elements of face-to-face interaction, positive interdependence, individual accountability, and assessment of group processes are more effective than less structured small-group strategies typically implemented in training settings. Instructional designers should consider using cooperative learning strategies as a method for increasing team interaction and performance in training. Implementation of cooperative learning may be a strategy for developing groups of independent employees into effective workplace teams. □

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