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ABSTRACT

Research on cooperative learning has been conducted primarily in elementary education. R. E. Slavin (1991) however, notes that researchers are beginning to investigate the effectiveness of cooperative learning at the college level. A study examined cooperative learning at the college level from a communication perspective. The approach considers communication apprehension and its effects on cognitive principles of learning as well as the relationship between cooperative learning and achievement. More specifically, its hypotheses are as follows: (1) students in cooperative learning environments will show significantly greater learning of selected sociology concepts than students working in individualistic environments; and (2) students in a cooperative learning environment will show significantly higher gains in willingness to communicate as compared to students in individualistic learning environments. Subjects, 125 undergraduate sociology students in the experimental group and 111 students in the control group completed pre- and posttest surveys. The 30-item survey consisted of 3 sections: demographics, CAPS scale and sociology questions. Results proved both hypotheses to be wrong; there were no significant differences between students in either group. One reason for the negative results could be that the amount of time spent in a cooperative learning setting amounted to only about 10% of the total class time. Future research should examine formal cooperative learning groups which utilize cooperative learning characteristics. More research is also needed to explore cooperative learning at the college level. (Contains a table of data and 30 references.) (TB)

Can We All Get Along?
Cooperative Learning, Communication Apprehension, and Cognition in College Classrooms

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Abstract

Cooperative learning is an educational strategy often employed in elementary classrooms, but rarely in college classrooms. The purpose of this research project is to examine communicative and cognitive aspects of cooperative learning at the college level.

Two hundred thirty six participants consisted of students from two introductory sociology large lecture classes completed pretest and posttest surveys. Survey items measured classroom apprehension and sociology conceptual knowledge.

T-test scores indicated that no significant differences between the control and experimental groups in classroom apprehension and sociological conceptual knowledge were found. Change score revealed improvement with cooperative learning environment and willingness to communicate.

Can We All Get Along?

Cooperative Learning, Communication Apprehension, and Cognition in College Classrooms

Research on cooperative learning has been conducted primarily in elementary education. Some research exists at the secondary education level while little research exists at the higher educational level. Slavin (1991) notes that slowly researchers are investigating cooperative learning at the college level. For most people, college provides the final stepping stone into the professional world where people work in groups, yet few college classrooms incorporate working in groups with individual accountability and interdependence.

Cooperative learning has similar characteristics to the small group communication process; however, cooperative learning is studied predominantly in the educational arena and not in the communication field. A different perspective towards cooperative learning involves examining the communication variables in cooperative learning. Communication apprehension may affect students' lack of participation in cooperative learning groups. Examining communication in cooperative learning in relation to achievement outcomes integrates the two academic fields.

Examining the cognitive domains of cooperative learning in relation to communication apprehension at the college level has both theoretical and practical value. On a theoretical level,

little information exists regarding the degree of communication apprehension in cooperative learning groups. This experimental study will add to communication theory by explaining the relationship of interaction and cognitive gains associated with cooperative learning groups. This study will also contribute to the cooperative learning concept by examining cooperative learning at the college level since few studies exist on cooperative learning in higher education. From a pragmatic viewpoint, students may benefit both communicatively and cognitively from the cooperative learning experience.

The purpose of this research proposal is to examine cooperative learning from a communication perspective. The communication perspective will consider communication apprehension and its effects on cognitive principles of learning at the college level. Although there is much research on cooperative learning at lower educational levels, this project will add to an area where little research exists. The review of literature will explain the cooperative learning characteristics, address the effects of communication apprehension, and discuss the relationship between cooperative learning and achievement. The review of literature will conclude with the presentation of the hypotheses.

Review of Literature

Characteristics

Cooperative learning "refers to classroom techniques in which students work on learning activities in small groups and receive rewards or recognition based upon their group's performance" (Slavin, 1980, p. 315). Manning and Lucking (1991) add that grades or public recognition are possible rewards students receive for their academic performance accomplished within groups.

The most important term in the definition is *learn*. Students *learn* something, not simply *do* something (Slavin, 1991). To enhance group learning, all students must contribute to the understanding of class concepts so everyone knows the information which usually fosters a cooperative environment because the students are working together. A group which can do something without the help of all members fosters a competitive, individualistic environment. One group member could do all the work, but not everyone in the group has learned from the experience.

A second component of the definition is reward. There are two types of reward structures. The first reward structure is individual in nature, a person's reward depends upon her/his own contribution to the assignment. The second reward structure is a group reward in which members' contributions are combined for one total group score and all group members receive the same score

(Webb, 1982). Instructors may use one reward or both reward structures. Webb has discovered that with individual rewards, members spend fewer collective hours as a group on the project while with group rewards, members spend more time on the project. Group rewards then seem to produce more cooperation than individual rewards (Webb, 1982).

The ideal cooperative group consists of four to five members with a blend of gender, ethnicity, and ability levels (Rau & Heyl, 1990; Slavin, 1990). At first, the heterogenous group may seem difficult to work with, but it provides optimal outcomes because of the diverse backgrounds. Since the goal of the project is to learn, diverse backgrounds offer more of an opportunity to accomplish this outcome since the members must depend upon each other to achieve the group's goal. For example, what skill one group member may lack, another group member may possess. Rau and Heyl (1990) also suggest three means for group selection. First, self-selection has students choosing peers as group members. Second, random selection involves students numbering off and pairing up with other students who have the same number. Third, criterion-based selection has the instructor selecting group members based upon specific characteristics the instructor wants the group to have. For example, the instructor may want at least two females in every group as well as a person from a rural and suburban regional area.

Five characteristics are often present in the cooperative learning process (Johnson, Johnson, & Holubec, 1976; Slavin, 1980): (a) reward interdependence-everyone in the group will receive the same reward which is also known as positive interdependence, (b) individual accountability, (c) task interdependence, (d) teacher imposed structure, and (e) non-use of group competition. Ideally, all five characteristics should be present, but the type of task determines the degree to which the five are utilized in cooperative learning. Of the five mentioned, the two dimensions that appear most common in cooperative learning methods are reward interdependence and individual accountability.

Reward interdependence refers to how the success of one student in the group influences the success of another student in the group (Slavin, 1980). One group member cannot do all the work for the group to achieve success. Each group member's help is needed to accomplish the task which indicates that positive interdependence reinforces the idea that the group will "sink or swim together" (Marino-Leggett & Salomon, 1990, p. 276). Positive interdependence helps students work together and celebrate the rewards they earn together (Brandt, 1989/1990).

Individual accountability is another dimension that is used often in cooperative learning. Individual accountability means that a group has not accomplished its task until every group

member learns and understands the material or until everyone has contributed a fair amount to the assignment (Manarino-Leggett & Salomon, 1990). Each group member has an active responsibility for the group's outcome (Billson, 1986). Individual accountability works well in heterogenous ability groups consisting of high and low achievers. High achievers want to help low achievers learn so everyone has accomplished the goal, while low achievers want to excel for the team to do well (Augustine, Gruber, & Hanson, 1989/1990; Kagan, 1989/1990).

The third characteristic is task interdependence or face-to-face interaction which means that all group members must be present. The interaction allows students to meet other students in class and get to know the group members (Rau & Heyl, 1990). A few common goals students can attain through interaction are becoming acquainted with each other, being specific when communicating, creating a supportive environment, and resolving conflicts (Johnson & Johnson, 1989).

The fourth characteristic is teacher imposed structure. Instructors must create specific guidelines which students must work toward and achieve. There are eight common structures that instructors can use or they can create their own. The eight cooperative learning structures are: (a) learning together, (b) student teams-achievement division, (c) teams-games-tournaments, (d) jigsaw, (e) jigsaw II, (f) team assisted individualization,

(g) cooperative integrated reading and composition, and (h) group investigation (Manning & Lucking, 1991; Sharan & Sharan, 1989/1990; Slavin, 1991).

The fifth characteristic relates to non-use of group competition. Non-use of competition becomes the team building, group togetherness section of cooperative learning. This characteristic focuses on members working together and reinforces the reason for using cooperative learning. Cooperative learning helps students achieve academically and socially which are the primary reasons instructors use cooperative learning (Tyrrell, 1990).

Achievement

Cognitive achievement is still a primary reason instructors integrate cooperative learning in classroom assignments. Most researchers agree that cooperative learning influences achievement in a positive way, however, the degree to which achievement is increased varies. Of the 67 studies relating to cooperative learning and cognitive achievement, 41 studies found significant achievement for students who work in groups, 25 studies discovered no achievement difference, and the remaining study revealed students working in groups did worse (Slavin, 1991). The variability in results relates to the different teacher imposed structure. Johnson, Johnson, Johnson, and Anderson (1976) believe that the classroom structure affects

student outcomes which in turn influence cognitive outcomes.

There seems to be a positive link between cooperative learning and cognitive learning. Simply from working in teams, students show achievement gains compared to students working as individuals (Fraser, Beaman, Diener, & Kelem, 1977; Shaw, 1981; Slavin & Oickle, 1981). Rau and Heyl (1990) also support the view of group learning: "isolated students do not learn as much or do as well as students who are embedded in a network of social relations" (p. 144). Instructor goals such as improved learning, retention, and critical thinking may transpire in cognitive learning groups (Johnson & Johnson, 1989/1990).

Conflicting results appear when measuring achievement. If an inappropriate classroom learning environment such as competition, instead of cooperation is fostered this may influence achievement negatively. It is also possible that some individual personality characteristics which are difficult to control may affect achievement. Finally, students deem the cooperative learning experience successful if they meet the group goals they have set (Ames, 1981). If the group does not reach its goals, negative consequences can develop, such as animosity towards peers.

Communication Apprehension

Communication apprehension is defined as "fear or anxiety associated with either real or anticipated communication with

another person or persons" (McCroskey, 1977, p. 78). Researchers often associate communication apprehension with unwillingness to communicate. Comadena's study (1984) suggests that communication apprehensive people usually have a difficult time participating in group projects, they contribute fewer ideas.

People with high levels of communication apprehension do not participate in group work for fear other group members will criticize their ideas which will create a negative communication experience and will make them tense in such situations (Burgoon & Burgoon, 1974). If the group project is a required assignment, then the apprehensive person often has a silent role within the group. Part of the fear of communicating may come from a competitive environment the group has created.

Neer has developed a scale that measures unwillingness to communicate in one particular situation-the classroom. The scale is entitled Classroom Apprehension about Participation Scale (CAPS) and it measures two dimensions which are communication participation and communication confidence. Participation examines communication during discussion and confidence measures nervousness or fear of evaluation during discussion. Neer has discovered the "classroom specific measure more accurately predicts apprehension about class discussion than (McCroskey's) PRCA alone" (Neer, 1987, p. 161). Even though Neer's scale measures specifically anxiety during class discussions, most

researchers continue to use McCroskey's scale because it is older and widely publicized.

Hypotheses

Throughout the review of literature, research has described the characteristics of cooperative learning, achievement, and communication apprehension. Cooperative learning characteristics include the purpose of using the method as well as its five dimensions. The cognitive principles address cognitive abilities students experience in cooperative learning groups. Communication apprehension relates to the problems communication apprehensive people encounter when working in groups. In general, research indicates that students seem to achieve more in cooperative learning groups than on an individual basis.

H1 Students in cooperative learning environments will show significantly greater learning of selected sociology concepts than students working in individualistic environments.

Cooperative learning provides a supportive environment that encourages group members to communicate with each other.

H2 Students in cooperative learning environment will show significantly greater gains in willingness to communicate compared to students in individualistic learning environments.

Method

Participants

Participants for the study were undergraduate students from two large lecture introductory sociology courses. One hundred twenty-five subjects in experimental group and 111 subjects in control group completed surveys twice, once at the beginning and once at the end of the semester. Since few college instructors incorporate cooperative learning, purposive nonrandom sampling method was used for the experimental group. The experimental group reflected the zero-history, one-day ad hoc groups formed for the four cooperative learning days in which the instructor gave students 20-25 minutes to work on the individual assignment and 50 minutes of class time to work on the group portion of the assignments. Groups consisting of three to five members were formed in relation to where people sat in the large lecture classroom. Due to students' territorial disposition, it was possible group members remain relatively the same during the four assignments, although someone from may have been absent on a cooperative learning assignment day which may have changed the group member composition. Group members;however, were not formally assigned to groups.

Variables

The one independent variable the learning environment, has two levels which are cooperative learning environment and individualistic learning environment. Cooperative learning

environment was operationalized as a one day ad hoc, zero history group which included group work to the traditional learning environment which focused on individual merit.

The independent variable for hypothesis 1 is the learning environment and the dependent variable is cognitive learning. Asking students sociology questions at the beginning of the semester determined what the students knew about sociology. Asking different sociology questions at the end of the semester revealed if subjects were able to recall accurately information from topics discussed throughout the semester.

The independent variable in the second hypothesis is the learning environment and the dependent variable is willingness to communicate and affiliation. The scale used to measure willingness to communicate was Classroom Apprehension about Participation (CAPS) (Neer, 1987). Neer's scale produces an alpha reliability of .94, in this study the pretest reliability was .91 and the posttest reliability was .86.

Measurement

The 30 item survey consisted of three sections: demographics, CAPS scale, and sociology questions. The demographic questions included gender, ethnicity, class standing, overall grade point average, expected final course grade, and major. The CAPS scale consisted of fifteen Likert-type statements from the CAPS scale. The Likert-type statements

ranged from one (strongly agree) to five (strongly disagree). The six sociology questions had multiple choice answers (a,b,c,d) that related to class topics from deviant behavior to bureaucracy. The posttest survey consisted of the fifteen Likert-type statements from the CAPS scale and ten sociology questions-the six pretest sociology questions and four additional sociology questions.

The desired outcome was that students from cooperative learning groups would recall the information more accurately than students who learned on an individual basis. The cognitive learning score was not easy to control because extraneous factors such as respondents from the individualistic environment may have studied in cooperative learning groups outside of class which may have influenced the results.

Procedures

During the first week of the semester, both classes received a set of questionnaires. The surveys were administered and collected during class. Posttests were given during the last week of the semester. Surveys were identified by respondent's last four digits of her/his social security number. Only those subjects that completed both the pretest and post-test were used for the research.

Statistical Analysis

The purpose of the statistical tests was to discover any similarities, differences, or no changes in relation to the independent and dependent variables. The alpha probability level for all tests was a significance of .05.

For hypothesis 1, a t-test measured the independent variable which is the learning environment and its two levels of cooperative learning and individualistic learning in relation to the dependent variable achievement. For the dependent variable, central tendencies were used for individual respondent scores regarding the achievement questions. Change scores were also run to determine differences between pretest and posttest scores

For hypothesis 2, t-tests compared the two levels of the independent variable to the outcomes from the dependent variable of willingness to communicate. Change scores were also run to determine changes between pretest and posttest scores for willingness to communicate.

Results

Sociology Concepts

Hypothesis 1 predicted that students in the cooperative learning environment would score higher on sociology questions compared to students in the individualistic environment. The frequency and percentage of respondents who correctly answered the sociology question is represented in Table 1. The results of the t-test performed on the six pretest sociology questions

revealed no significant difference (t=-.96, df=229, ns) between the control and experimental group. The mean (M=4.10) for the cooperative learning group is slightly higher than the mean (M=3.96) for the individualistic learning group, but not significantly.

Insert Table 1 Here

The t-test results for the ten posttest sociology questions yielded no significant difference (t=.06, df=2.34, ns). The individualistic learning group (M=7.12) scored higher on posttest questions compared to the cooperative learning group (M=7.11). In the pretest, the cooperative learning group did slightly better than the individualistic group, yet in the posttest the individualistic group performed slightly better, but not significantly better than the cooperative learning group.

T-test results between the cooperative learning group and the individualistic learning group indicate no significant difference. T-test results (t=.01, df=227, ns) for change scores between the pretest scores and the posttest scores also indicate no significant difference. The means for student increase in sociology concepts from pretest to posttest is the same (M=1.24).

Communication Apprehension

Hypothesis 2 predicted the cooperative learning environment will have greater gains in willingness to communicate than the

individualistic environment. The pretest t-test results indicate no significant differences for willingness to communicate (t=-1.54, df=230, ns) between the cooperative learning environment and the individualistic learning environment. Respondents in the cooperative learning environment (M=48.54) are similar in the amount of apprehension to the respondents in the individualistic learning environment (M=48.53).

The posttest CAPS scores indicate both environments are similar in amount of apprehension with the cooperative learning group (M=48.16) compared to the individualistic learning group (M=48.09). The t-test results indicate no differences (t=-.05, df=233, ns). During both tests, the cooperative learning group showed slightly higher apprehension on the CAPS scale; however, the difference from the pretest to the posttest indicates a decrease of .38.

T-test results from a change between pretest communication apprehension scores and posttest communication apprehension scores indicate a significant difference (t=2.62, df=230, p=.01) From pretest to posttest, the cooperative learning group decreased their apprehension (M=-.49) while the individualistic group increased their apprehension from pretest to posttest (M=1.71).

Change score results indicate support for the willingness to communicate, but lack support for hypothesis 1. No difference

between the individualistic learning group and the cooperative learning group were found for achievement. Only willingness to communicate displayed significance in the predicted direction.

Discussion

Summary of Results

Hypothesis 1 predicted students in the cooperative learning group would show greater learning of sociology concepts than students in the individualistic learning group. Inconsistent findings exist regarding achievement gains from cooperative learning exercises, yet most research has found student achievement gains from cooperative learning (Fraser, Beaman, Diener, & Kelem, 1977; Shaw, 1981; Slavin & Oickle, 1981).

Hypothesis 1 was not supported. Knowledge of the sociology concepts was measured through six multiple choice questions in the pretest and ten multiple choice questions in the posttest regarding general sociology concepts. T-test results indicate no difference between the cooperative learning group and the individualistic learning group. Achievement gains have been found when sample size included 15 to 50 students per class (Rau & Heyl, 1990). One explanation for the lack of difference may be that earlier research studied elementary school individualistic and cooperative learning scores.

Hypothesis 2 predicted students in the cooperative learning setting would increase their willingness to communicate compared

to students in the individualistic setting. Communicatively apprehensive students try to avoid participating in group work for fear their peers will criticize their ideas (Burgoon & Burgoon, 1976). The cooperative learning group creates a supportive environment where students feel comfortable taking risks and sharing ideas without negative evaluation (Billson, 1986; Scott & Heller, 1991). Earning a satisfactory grade on the cooperative learning project may also help motivate students to overcome their apprehension.

Change scores support the hypothesis. Change scores indicate a reduction in apprehension among the cooperative learning respondents. Thus, students who work in cooperative learning groups seem to increase their willingness to communicate.

Implications of the Findings

The use of cooperative learning in the classroom as a means for improving student achievement has received mixed reviews. Slavin's (1991) review of cooperative learning studies states that 67 studies have explored cooperative learning and cognitive learning. From those studies, 41 indicate significant achievement in the cooperative learning group, 25 studies indicate no difference in achievement, and 1 study discovered that students learned less in cooperative learning groups. This

research project found no difference in achievement between the cooperative and individualistic learning setting.

The amount of time spent in cooperative learning exercises may also explain the lack of significant results for final course grade. The cooperative learning group spent four seventy-five minutes class periods of the sixteen week semester working on cooperative exercises. During that time, students answered the questions individually and then answered other questions as a group for the cooperative assignment. If students finished the assignment early, they were allowed to leave. Rau and Heyl (1990) gave students the individual questions to work on outside of class and then spent six seventy-five minute class periods of the sixteen week semester entirely devoted to the cooperative learning exercises. Even though students may have liked working in groups and may have become significantly less apprehensive, ten percent of the semester class time is still not enough time to measure any differences. Previous research studies do not state the specific amount of time devoted to working on cooperative exercises, yet it seems the more time devoted during class periods, the greater the opportunity for increases in achievement.

Using only some of the five cooperative learning characteristics may also affect achievement. Cooperative learning differs from individualistic learning in five ways: (a)

reward interdependence, (b) individual accountability, (c) task interdependence, (d) teacher imposed structure, and (e) non-use of group competition (Manning & Lucking, 1991; Sharan & Sharan, 1989/1990; Slavin, 1991). The cooperative learning instructor in this study may not have utilized all the cooperative learning characteristics necessary for success. Task interdependence and individual accountability are essential for achievement gains (Slavin, 1989/1990; 1990; 1991). The instructor used individual accountability when students completed the first half the assignment individually; however, task interdependence seemed to be missing from the cooperative learning assignment based upon the instructor's description of the assignment. The lack of cooperative learning characteristics also represents the fact that this study compared individuals with individuals and not individuals with real groups.

Limitations

A primary weakness with the study was the structure of the cooperative learning group. For academic and social success, all five characteristics should be present (Tyrrell, 1990). Unfortunately, the cooperative learning groups for this study lacked control of standard group membership because students formed groups with people seated near them. Even though people

tend to sit in the same area, if a person was absent the day of an assignment the group's members would change from assignment to assignment. It is possible for students to have worked with different people for each cooperative learning exercise. Rau and Heyl (1990) report the importance of having the same group members complete the assignments throughout the semester.

Another limitation may be the manner in which achievement was measured. Most of the sociology questions were lower level recall questions. There were few questions which tested higher cognitive levels such as application. More test questions should have tapped higher levels of learning to help differentiate what student learned from class lectures and group assignments and what they already knew. The instrument may not have been long enough. Even though four questions were added to the posttest, ten questions may not significantly measure achievement.

The limitations presented with the cooperative learning group and achievement correspond to problems with this field study and the lack of control. The transition from conceptual ideal in the use of cooperative learning groups in a large class setting and the operational use of cooperative learning assignments in the class seemed to differ. The instructor's description of how cooperative learning was to be used in the classroom did not correspond to the actual use of the concept in the classroom. Control was also lacking in the study primarily

from using different instructors in the control and experimental groups. Future research should have more control over the cooperative learning group.

Suggestions for Future Research

Future research should examine formal cooperative learning groups which utilize the cooperative learning characteristics. Cooperative learning groups should be structured such that students are in the same groups throughout the semester. When students develop working relationships with group members, there is an opportunity to increase affiliation through the supportive environment which may help students feel comfortable and decrease apprehension.

Another suggestion for future research is to change the size of classes and the number of classes used in the study of cooperative learning. Smaller classes make it easier to monitor interaction among students. Using cooperative learning in small classes seems to foster a sense of camaraderie and support among students which does not seem to be found in large lecture classes. If each class is considered a subject, then 30-40 classes should use standardized cooperative learning techniques.

If two classes are used, one instructor should teach both classes. The same course requirements should be used for cooperative learning and individualistic groups. The amount of tests, written assignments, and grading criteria should be the

same for individualistic learning class and the cooperative learning class with the main difference being the manner in which the material is learned. In addition, the instructor should be formally trained in the concept of cooperative learning and how it is used in the classroom. Cooperative learning is more than placing students in groups and giving them an assignment.

Future research should also examine the cognitive achievement instrument. If the multiple choice measurement is used questions should measure lower level and higher level cognitive ability of the concept. Another alternative may be asking essay questions in which students create the answer based upon the information they have learned in class instead of using multiple choice questions in which the answer is provided for the students.

Finally, more research needs to explore the topic of cooperative learning at the college level. Studying how students learn in cooperative learning groups at the college level and how that differs from using cooperative learning at the primary levels creates an opportunity for more hypothesis testing.

The summary of results, implications of the findings, limitations, and suggestions for future research portions of the discussion section have provided an indepth look at the meanings derived from this research project. The summary of results presented past research that help formulate the prediction made

in the hypotheses as well as explanations for the results discovered. The implications of the findings offered generalizations about the achievement, and communication variables studied in this project. The two areas the limitations focused on included problems with the cooperative leaning group and achievement. Suggestions for future research provided suggestions for other researchers who are interested in cooperative learning the opportunity to examine cooperative learning at the college level.

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APPENDIX A

Table 1

Proportion of Sample Selecting Correct Answer on Sociology Questions

	Individualistic (N=111)		Cooperative (N=125)	
Topics	Pretest	Posttest	Pretest	Posttest
Deviance	.78	.95	.75	.97
Definition	.87	.84	.67	.72
Tradition	.80	.87	.85	.92
Bureaucracy	.85	.92	.83	.90
Collective Behavior	.39	.41	.46	.47
Assimilation	.68	.84	.70	.85
Gender Inequality		.90		.80
Ethnicity		.61		.62
Latent Function		.43		.70
Population		.50		.24