AN OVERVIEW OF COOPERATIVE LEARNING

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Without the cooperation of its members society cannot survive, and the society of man has survived because the cooperativeness of its members made survival possible.... It was not an advantageous individual here and there who did so, but the group. In human societies the individuals who are most likely to *survive are those who are best enabled to do so by their group.*

(Ashley Montagu, 1965)

How students perceive each other and interact with one another is a neglected aspect of instruction. Much training time is devoted to helping teachers arrange appropriate interactions between students and materials (i.e., textbooks, curriculum programs) and some time is spent on how teachers should interact with students, but how students should interact with one another is relatively ignored. It should not be. How teachers structure student-student interaction patterns has a lot to say about how well students learn, how they feel about school and the teacher, how they feel about each other, and how much self-esteem they have.

There are three basic ways students can interact with each other as they learn. They can compete to see who is "best," they can work individualistically toward a goal without paying attention to other students, or they can work cooperatively with a vested interest in each other's learning as well as their own. Of the three interaction patterns, competition is presently the most dominant. Research indicates that a vast majority of students in the United States view school as a competitive enterprise where one tries to do better than other students. This competitive expectation is already widespread when students enter school and grows stronger as they progress through school (Johnson & R. Johnson, 1991). Cooperation among students-who celebrate each other's successes, encourage each other to do homework, and learn to work together regardless of ethnic backgrounds or whether they are male or female, bright or struggling, disabled or not, is still rare.

BASIC DEFINITIONS

Even though these three interaction patterns are not equally effective in helping students learn concepts and skills, it is important that students learn to interact effectively in each of these ways. Students will face situations in which all three interaction patterns are operating and they will need to be able to be effective in each. They also should be able to select the appropriate interaction pattern suited to the situation. An interpersonal, competitive situation is characterized by negative goal interdependence where, when one person wins, the others lose; for example, spelling bees or races against other students to get the correct answers to a math problem on the blackboard. In individualistic learning

situations, students are independent of one another and are working toward a set criteria where their success depends on their own performance in relation to an established criteria. The success or failure of other students does not affect their score. For example, in spelling, with all students working on their own, any student who correctly spells 90% or more words passes. In a cooperative learning situation, interaction is characterized by positive goal interdependence with individual accountability. Positive goal interdependence requires acceptance by a group that they "sink or swim together." A cooperative spelling class is one where students are working together in small groups to help each other learn the words in order to take the spelling test individually on another day. Each student's score on the test is increased by bonus points if the group is successful (i.e., the group totals meet specified criteria). In a cooperative learning situation, a student needs to be concerned with how he or she spells and how well the other students in his or her group spell. This cooperative umbrella can also be extended over the entire class if bonus points are awarded to each student when the class can spell more words than a reasonable, but demanding, criteria set by the teacher.

There is a difference between simply having students work in a group and structuring groups of students to work cooperatively. A group of students sitting at the same table doing their own work, but free to talk with each other as they work, is not structured to be a cooperative group, as there is no positive interdependence. Perhaps it could be called individualistic learning with talking. For this to be a cooperative learning situation, there needs to be an accepted common goal on which the group is rewarded for its efforts. If a group of students has been assigned to do a report, but only one student does all the work and the others go along for a free ride, it is not a cooperative group. A cooperative group has a sense of individual accountability that means that all students need to know the material or spell well for the whole group to be successful. Putting students into groups does not necessarily gain a cooperative relationship; it has to be structured and managed by the teacher or professor.

ELEMENTS OF COOPERATIVE LEARNING

It is only under certain conditions that cooperative efforts may be expected to be more productive than competitive and individualistic efforts. Those conditions are:

1. Clearly perceived positive interdependence
2. Considerable promotive (face-to-face) interaction
3. Clearly perceived individual accountability and personal responsibility to achieve the group's goals
4. Frequent use of the relevant interpersonal and small-group skills
5. Frequent and regular group processing of current functioning to improve the group's future effectiveness

All healthy cooperative relationships have these five basic elements present. This is true of peer tutoring, partner learning, peer mediation, adult work groups, families, and other cooperative relationships. This conceptual "yardstick" should define any cooperative relationship.

1. Positive Interdependence

The first requirement for an effectively structured cooperative lesson is that students believe that they "sink or swim together." Within cooperative learning situations, students have two responsibilities: 1) learn the assigned material, and 2) ensure that all members of the group learn the assigned material. The technical term for that dual responsibility is *positive interdependence.* Positive interdependence exists when students perceive that they are linked with group mates in such a way that they cannot succeed unless their group mates do (and vice versa) and/or that they must coordinate their efforts with the efforts of their group mates to complete a task. Positive interdependence promotes a situation in which students: 1) see that their work benefits group mates and their group mates' work benefits them, and 2) work together in small groups to maximize the learning of all members by sharing their resources to provide mutual support and encouragement and to celebrate their joint success. When positive interdependence is clearly understood, it establishes that:

1. Each group member's efforts are required and indispensable for group success (i.e., there can be no "free-riders").
2. Each group member has a unique contribution to make to the joint effort because of his or her resources and/or role and task responsibilities.

There are a number of ways of structuring positive interdependence within a learning group.

Positive Goal Interdependence Students perceive that they can achieve their learning goals if' and only if all the members of their group also attain their goals. The group is united around a common goal -- a concrete reason for being. To ensure that students believe they "sink or swim together" and care about how much each other learns, the teacher has to structure a clear group or mutual goal, such as "learn the assigned material and make sure that all members of the group learn the assigned material." The group goal always has to be a part of the lesson.

Positive Reward -- Celebrate Interdependence Each group member receives the same reward when the group achieves its goals. To supplement goal interdependence, teachers may wish to add joint rewards (e.g., if all members of the group score 90% correct or better on the test, each receives 5 bonus points). Sometimes teachers give students: 1) a group grade for the overall production of their group, 2) an individual grade resulting from tests, and 3) bonus points if all members of the group achieve the criterion on tests. Regular celebrations of group efforts and success enhance the quality of cooperation.

Positive Resource Interdependence Each group member has only a portion of the resources, information, or materials necessary for the task to be completed; the members' resources have to be combined for the group to achieve its goals. Teachers may wish to highlight the cooperative relationships by giving students limited resources that must be shared (one copy of the problem or task per group) or giving each student part of the required resources that the group must then fit together (the Jigsaw procedure).

Positive Role Interdependence Each member is assigned complementary and interconnected roles that specify responsibilities that the group needs in order to complete the joint task. Teachers create role interdependence among students when they assign them complementary roles such as reader, recorder, checker of understanding, encourager of participation, and elaborator of knowledge. Such roles are vital to high-quality learning. The role of checker, for example, focuses on periodically asking each group mate to explain what is being learned. Rosenshine and Stevens (1986) reviewed a large body of well-controlled research on teaching effectiveness at the pre-collegiate level and found "checking for comprehension" to be one specific teaching behavior that was significantly associated with higher levels of student learning and achievement. Although the teacher cannot continually check the understanding of every student, the teacher can engineer such checking by having students work in cooperative groups and assigning one member the role of checker.

There are other types of positive interdependence. Positive task interdependence exists when a division of labor is created so that the actions of one group member have to be completed if the next member is to complete his or her responsibility. Positive identity interdependence exists when a mutual identity is established through a name or motto. Outside threat interdependence exists when groups are placed in competition with each other. Fantasy interdependence exists when a task is given that requires group members to imagine that they are in a hypothetical situation.

We have conducted a series of studies investigating the nature of positive interdependence and the relative power of the different types of positive interdependence (Hwong, Caswell, Johnson, & Johnson, 1993; Johnson, Johnson, Ortiz, & Starme, 1991; Johnson, Johnson, Stanne, & Garibaldi, 1990; Low, Mesch, Johnson, & Johnson, 1986a, 1986b; Mesch, Johnson, & Johnson, 1988; Mesch, Lew, Johnson, & Johnson, 1986). Our research indicates that positive interdependence provides the context within which promotive interaction takes place. Group membership and interpersonal interaction among students do not produce higher achievement unless positive interdependence is clearly structured. The combination of goal and reward interdependence increases achievement over goal interdependence alone and resource interdependence does not increase achievement unless goal interdependence is present also.

2. Face-to-Face Promotive Interaction

In an industrial organization, it's the group effort that counts. There's really no room for stars in an industrial organization. You need talented people, but they can't do it alone. They have to have help.

(John F. Donnelly, President, Donnelly Mirrors)

Positive interdependence results in promotive interaction. Promotive interaction may be defined as individuals encouraging and facilitating each other's efforts to achieve, complete tasks, and produce in order to reach the group's goals. Although positive interdependence in and of itself may have some effect on outcomes, it is the face-to-face

promotive interaction among individuals fostered by the positive inter-relationships, and psychological adjustment and social competence. Promotive interaction is characterized by individuals providing each other with efficient and effective help and assistance; exchanging needed resources, such as information and materials, *and* processing information more efficiently and effectively; providing each other with feedback in order to improve their subsequent performance; challenging each other's conclusions and reasoning in order to promote higher quality decision making and greater insight into the problems being considered; advocating the exertion of effort to achieve mutual goals; influencing each other's efforts to achieve the group's goals; acting in trusting and trustworthy ways; being motivated to strive for mutual benefit; and maintaining a moderate level of arousal characterized by low anxiety and stress.

3. Individual Accountability/Personal Responsibility

What children can do together today, they can do alone tomorrow.

(Let Vygotsky, 1962)

Among the early settlers of Massachusetts there was a saying, "If you do not work, you do not eat." Everyone had to do their fair share of the work. The third essential element of cooperative learning is individual accountability, which exists when the performance of individual students is assessed, the results are given back to the individual and the group, and the student is held responsible by group mates for contributing his or her fair share to the group's success. It is important that the group-knows who needs more assistance, support, and encouragement in completing the assignment. It is also important that group members know they cannot "hitchhike" on the work of others. When it is difficult to identify members' contributions, when members' contributions are redundant, and when members are not responsible for the final group outcome, they may be seeking a free ride (Harkins & Petty, 1982; Ingham, Levinger, Graves, & Peckham, 1974; Kerr & Bruun, 1981; Latane, Williams, & Harkins, 1979; Moede, 1927; Petty, 1-larkins, Williams, & Latane, 1977; Williams, 1981; Williams, Harkins, & Latane, 1981). This is called social loafing.

The purpose of cooperative learning groups is to make each member a stronger individual in his or her own right. Individual accountability is the key to ensuring that all group members are, in fact, strengthened by learning cooperatively. After participating in a cooperative lesson, group members should be better prepared *to* complete similar tasks by themselves.

To ensure that each student is individually accountable to do his or her fair share of the group's work, teachers need to assess how much effort each member is contributing to the group's work, provide feedback to groups and individual students, help groups avoid redundant efforts by members, and ensure that every member is responsible for the final outcome. Common ways to structure individual accountability include:

1. Keeping the size of the group small. The smaller the size of the group, the greater the individual accountability may be.
2. Giving an individual test to each student.
3. Randomly examining students orally by calling on one student to present his or her group's work to the teacher (in the presence of the group) or to the entire class.
4. Observing each group and recording the frequency with which each member-contributes to the group's work.
5. Assigning one student in each group the role of checker. The checker asks other group members to explain the reasoning and rationale underlying group answers.
6. Having students teach what they learned to someone else. When all students do this, it is called *simultaneous explaining.*

There is a pattern to classroom learning. First, students learn knowledge, skills, strategies, or procedures in a cooperative group. Second, students apply the knowledge or perform the skill, strategy, or procedure alone to demonstrate their personal mastery of the material. Students learn it together and then perform it alone.

4. Interpersonal and Small-Group Skills

I will pay more for the ability to deal with people than any other ability under the sun.

(John D. Rockefeller)

The fourth essential element of cooperative learning is the appropriate use of interpersonal and small-group skills. In order to coordinate efforts to achieve mutual goals, students must: 1) get to know and trust each other, 2) communicate accurately and unambiguously, 3) accept and support each other, and 4) resolve conflict constructively (Johnson, 1990, 1991; Johnson & F. Johnson, 1991). Placing socially unskilled students in a group and telling them to cooperate does not guarantee that they have the ability to do so effectively. We are not born instinctively knowing how to interact effectively with others. Interpersonal and small-group skills do not magically appear when they are needed. Students must be taught the social skills required for high quality collaboration and be motivated to use them if cooperative groups are to be productive. The whole field of group dynamics is based on the premise that social skills are the key to group productivity (Johnson & F. Johnson, 1991).

The more socially skillful students are and the more attention teachers pay-to teaching and rewarding the use of social skills, the higher the achievement that can be expected within cooperative learning groups. In their studies on the long-term implementation of cooperative learning, Lew and Mesch (Lew et al., 1986a, 1986b; Mesch et al., 1988; Mesch et al., 1986) investigated the impact of a reward contingency for using social skills as well as positive interdependence and a contingency for academic achievement on performance within cooperative learning groups. In the cooperative skills conditions, students were trained weekly in four social skills and each member of a cooperative group was given two bonus points toward the quiz grade if all group members were observed by the teacher to demonstrate three out of four cooperative skills. The results indicated that the combination of positive interdependence, an academic contingency for

high performance by all group members, and a social skills contingency promoted the highest achievement.

5. Group Processing

Take care of each other. Share your energies with the group. No one must feel alone, cut off, for that is when you do not make it.

(Willi Unsoeld, Renowned Mountain Climber)

The fifth essential component of cooperative learning is group processing. Effective group work is influenced by whether or not groups reflect on (i.e., process) how well they are functioning. A process is an identifiable sequence of events taking place over time, and process goals refer to the sequence of events instrumental in achieving outcome goals (Johnson & F. Johnson, 1991). Group processing may be defined as reflecting on a group session to: 1) describe what member actions were helpful and unhelpful, and 2) make decisions about what actions to continue or change. The purpose of group processing is to clarify and improve the effectiveness of the members in contributing to the collaborative efforts to achieve the group's goals.

While the teacher systematically observes the cooperative learning groups, he or she attains a "window" into what students do and do not understand as they explain to each other how to complete the assignment. Listening in on the students' explanations provides valuable information about bow well the students understand the instructions, the major concepts and strategies being learned, and the basic elements of cooperative learning.

There are two levels of processing -- small group and whole class. In order to ensure that small-group processing takes place, teachers allocate some time at the end of each class session for each cooperative group to process how effectively members worked together. Groups need to describe what member actions were helpful and not helpful in completing the group's work and make decisions about what behaviors to continue or change. Such processing: 1) enables learning groups to focus on maintaining good working relationships among members, 2) facilitates the learning of cooperative skills, 3) ensures that members receive feedback on their participation, 4) ensures that students think on the metacognitive as well as the cognitive level, and 5) provides the means to celebrate the success of the group and reinforce the positive behaviors of group members. Some of the keys to successful small-group processing are allowing sufficient time for it to take place, providing a structure for processing (e.g., "List three things your group is doing well today and one thing you could improve."), emphasizing positive feedback, making the processing specific rather than general, maintaining student involvement in processing, reminding students to use their cooperative skills while they process, and communicating clear expectations as to the purpose of processing.

In addition to small-group processing, the teacher should periodically engage in whole-class processing. When cooperative learning groups are used, the teacher observes the

groups, analyzes the problems they have working together, and gives feedback to each group on how well they are working together. The teacher systematically moves from group to group and observes them at work. A formal observation sheet may be used to gather specific data on each group. At the end of the class period the teacher can then conduct a whole-class processing session by sharing with the class the results of his or her observations. If each group has a peer observer, the results of their observations may be added together to get overall class data.

An important aspect of both small-group and whole-class processing is group and class celebrations. It is feeling successful, appreciated, and respected that builds commitment to learning, enthusiasm about working in cooperative groups, and a sense of self-efficacy in terms of subject-matter mastery and working cooperatively with classmates.