Research Information Service

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Synthesis of Research on Cooperative Learning

Why have human beings been so successful as a species? We're not strong like tigers, big like elephants, protectively colored like lizards, or swift like gazelles. We're intelligent—but an intelligent man or woman alone in the jungle or forest would not survive for long. What has really made humans such successful animals is our ability to apply our intelligence to cooperation with others to accomplish group goals.

Our society is composed of cooperative groups—families, neighborhoods, work groups, political parties, clubs, teams. Of course, these groups also have competitive elements, but in all of them, if the individuals cannot cooperate to achieve a common goal, all lose out.

Since schools socialize children to assume adult roles, we might expect them to emphasize cooperative activity. Yet schools are among the institutions in our society least characterized by cooperative activity. For many teaching itself is one of the loneliest jobs in the world. Students experience cooperative activity in laboratory groups, project groups, and so on, but these occupy a small portion of a student's schooling. Most of the time, students work independently, but they are constantly compared with one another for grades, for praise, and for recognition. This competitive situation does not have the positive features of a competition between well-matched competitors. In the classroom the winners and losers can be predicted fairly reliably the day they first come into class: those who have succeeded in the past will probably succeed, and those who have failed will probably fail. For many low-performing students, no amount of effort will put them at the top of the class because they have already missed so much in past years. Because they have such a small chance of success, low performers may give up or try to disrupt the activity. High achievers may not do their best because they know they will be near the top anyway. The competition for grades and recognition may set up a pecking order in the classroom, with high performing students at the top. This further alienates low performing students, who may eventually turn to delinquency or withdrawal as a means of maintaining positive self-esteem in what they perceive as a hostile environment.

The problems of the competitive classroom have been discussed for years, but while there have been many complaints, there have been few practical solutions. Many teachers express frustration with the competitive classroom system, particularly because of what it means for low achieving students, but they have felt constrained by a lack of alternatives. Some educators have suggested that if competition is not the answer, cooperation must be. What would happen if we allowed students to work on academic materials in small, cooperative groups? It would probably be fun and reduce the isolation that many students feel in school. It might solve the problem of inevitable failure for many students.

Cooperation has its own problems. What would keep the cooperative groups from turning out like those laboratory groups in which one or two students often end up doing most of the work? Why should students help each other learn—why should they care how their classmates are doing? What would keep the more able students from belittling the contributions of their lower-performing peers? How in fact could low achievers contribute anything important to their groups?

It is not enough to tell children to cooperate. A program based on cooperative activity has to be "engineered" to answer these questions and to meet the practical exigencies of classroom life.

Cooperative Learning Methods

While research on cooperation goes back to the early 1900s (Johnson and Johnson, 1974; Slavin, 1977a), research on practical classroom applications of cooperative principles began in the 1970s, when several independent groups of researchers almost simultaneously developed cooperative instructional methods. All of the methods involve having the teacher assign students to four- to six-member learning groups in which there are high, average, and low achieving students. These groups typically have boys and girls, and Blacks, Anglos, Hispanics, and members of other ethnic groups in approximately the same proportion as they are represented in the whole class. In almost every other respect the methods differ markedly from each other.

Student Team Learning. The most extensively researched and widely used cooperative learning methods were developed by David DeVries, Keith Edwards, Robert Slavin, and their colleagues at Johns Hopkins University (Slavin, 1980a). These methods include *Student Teams-Achievement Divisions* (STAD), *Teams-Games-Tournament* (TGT), and *Jigsaw II*, in addition to many modifications and special purpose cooperative methods. In STAD, the teacher first presents a lesson. The students then meet in four- to five-member teams to attempt to master a set of worksheets on the lesson. Then the students take individual quizzes on the material. The scores the students contribute to their teams are based on the degree to which they represent an improvement over the student's own past average. The teams with the highest scores are recognized in a weekly class newsletter. In TGT students represent

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their teams in academic games. Students compete with others of similar past performance so that, as in STAD, any student who prepares well can be successful. Jigsaw II is a modification of Aronson's (1978) Jigsaw method.

Jigsaw. In Jigsaw, each student in a five- to six-member group is given a unique piece of information on a topic the whole group is studying. After they have read their sections, the students meet in "expert groups" with their counterparts from other groups to discuss their information. Then the students return to their groups and teach their groupmates what they have learned. The entire class may then take a test for individual grades.

Jigsaw II (Slavin, 1980a) is a modification of Jigsaw designed to integrate this method with the other student team learning methods and to simplify the teacher preparation required to use the method. In Jigsaw II, students are assigned to four- or five-member teams. They read narrative materials, such as social studies chapters, short stories, or biographies, and each team member is given a special topic on which to become an expert. The students discuss their topics in "expert groups," and then return to teach their teammates what they have learned. Finally, the students take a quiz on the material, and the quiz scores are used as in STAD to form individual and team scores.

Learning Together. The cooperative learning method closest to pure cooperation is that designed by Johnson and Johnson (1975). Students work in small groups to complete a single worksheet, for which the group receives praise and recognition.

Group-Investigation. The Group-Investigation model (Sharan and Sharan, 1976) is the most complex of the cooperative learning methods. Students in small groups take substantial responsibility for deciding what they will learn, how they will organize themselves to learn it, and how they will communicate what they have learned to their classmates.

Cooperative learning methods vary considerably, but their differences are primarily alternative ways to deal with the same problems inherent in cooperation. For example, most of the methods make it impossible for one student to do most of the group's work. In STAD and Jigsaw II students take individual quizzes without the help of their teammates to add points to their team scores; each student must know the material. In TGT, students play academic games with members of other teams to add points to their team scores; again, each student must know the material in order to contribute a high score. The Jigsaw, Jigsaw II, and Group-Investigation methods make it impossible for the group's work to be unevenly distributed by having each student become an expert on some part of the group task.

An inherent danger of the use of heterogeneous learning teams is that low achieving students will have little to contribute to the group's efforts, and that high achieving students will resent this or belittle the contributions of the low achievers. This danger is averted in STAD and Jigsaw II by having each student's contribution to the team score represent the degree to which the quiz score exceeds the student's own past average. In TGT, students compete against equals to add points to their team scores, which gives low achieving and high achieving students equal chances to contribute to the team score. Jigsaw, Jigsaw II, and Group-Investigation ensure that each student has something of value to contribute by giving students their own areas of expertise.

Making students value group success is vital to cooperative techniques because without a reason to cooperate, many students will refuse to do so. In STAD, TGT, and Jigsaw II, students receive recognition in a class newsletter if they are on high scoring teams. In the Johnsons' Learning Together methods, students often receive grades based on their group's performance. Jigsaw uses individual tests on which students must learn from their groupmates to do well, and in Group-Investigation, both class and teacher evaluations of group products motivate the groups to pull together.

The different methods vary in applications as well as in operational features. Group-Investigation, Jigsaw, and Jigsaw II are all used almost exclusively in social studies, while STAD, TGT, and Learning Together are used in all subjects. Jigsaw, Group-Investigation, and Learning Together have been used primarily in elementary schools; STAD, TGT, and Jigsaw II are used in secondary as well as elementary schools.

Cooperative Learning: The Research

What happens when we change from a traditional classroom organization to cooperative methods? A reasonable person would probably look for effects in two principal areas: student achievement and student social relationships. It would be logical to expect improved achievement because in a cooperative group, students are likely to encourage and help one another to learn. Positive effects on social relationships, such as race relations, are also logical outcomes to expect, because cooperative learning is, after all, a social intervention. Researchers studying cooperative learning have looked at a wide range of academic and social outcomes. This research has been reviewed recently by Sharan (1980) and Slavin (1980b), whose major conclusions are summarized here.

Academic Achievement. Anyone who has seen students working in cooperative groups can see that they enjoy doing so, that working cooperatively makes school work social and exciting. But what are the effects of working cooperatively on student achievement?

Twenty-seven studies have investigated the effects of cooperative learning programs on student learning, comparing the cooperative programs to traditional control groups in experiments lasting at least two weeks, but more often running for 8 to 16 weeks. A significant positive effect on student achievement was found in 19 of these studies, no differences in seven, and in one study there was a significant difference favoring the control group. The most successful methods for improving student achievement appear to be the Student Team Learning techniques; nine of ten TGT studies (DeVries and Slavin, 1978), four of six STAD studies (Slavin, 1978), one Jigsaw II study (Ziegler, in press) and one study of a combination of TGT, STAD, and Jigsaw II (Slavin and Karweit, 1979) all found significantly positive effects on student achievement (Slavin, 1980b). Three of the 18 Student Team Learning studies found no experimental-control differences in achievement.

One of the original Jigsaw studies found positive effects of this method on achievement (Lucker and others, 1976), and one found no differences (Blaney and others, 1977). The one Group-Investigation study to measure student achievement (Sharan and others, 1980) found positive effects of this method on what the authors call "high cognitive-level" skills, such as analysis, evaluation, and interpretation, but not on basic skills.

The pattern of results of the many cooperative learning studies indicates the importance of designing cooperative methods to resolve the problems inherent in cooperation. The Learning Together model is the closest of the cooperative learning models to pure cooperation; the students work in small groups to complete a single worksheet and receive praise for doing so. This model does not explicitly make it necessary for every group member to contribute to the group's work. Also, the informal group reward does not give group members a clear reason to help one another or to encourage their groupmates to learn. The Learning Together model was found in one study to be equal to the control group in achievement effects (Johnson and others, 1976), and lower than the control group in another (Johnson and others, 1978), the only negative finding for a cooperative learning method. Peterson and Janicki (1979) simply allowed students to work on their worksheets in small groups but gave no explicit group rewards for doing so. They also failed to find any differences in achievement between their small group method and a whole class control group.

The positive effects of cooperative learning methods on student achievement appear equally frequently in elementary and secondary schools, in urban, suburban, and rural schools, and in subjects as diverse as mathematics, language arts, social studies, and reading. There is a tendency for Blacks to gain outstandingly in achievement as a result of working cooperatively (Lucker and others, 1976; Slavin, 1977a; Slavin and Oickle, 1980), although Whites also achieve more as an outcome of cooperative learning. Most studies show high, average, and low achievers gaining equally from the cooperative experience. A few have shown somewhat greater gains for low achievers (DeVries and others, 1975; Edwards, DeVries, and Snyder, 1972; Peterson and Janicki, 1979; Slavin and Oickle, 1980), but a few others have shown the greatest gains for high achievers (Edwards and DeVries, 1972; Hulten and DeVries, 1976). Wheeler (1977) found that students who preferred to cooperate learned best in a cooperative program, while students who preferred to compete did best in a competitive program.

Sharan (1980) and Slavin (1980b) have hypothesized that the more tightly structured cooperative methods, such as STAD and TGT, will have the largest effects on basic skills, but higher-order cognitive skills may be best increased by more open-ended methods such as Group-Investigation. The evidence for this is only suggestive at present, but it may be that a mix of cooperative learning methods is needed to improve different kinds of learning. For example, STAD or TGT could be used to teach such subjects as mathematics, language mechanics, science concepts, foreign language, and geography; Jigsaw or Jigsaw II to teach subjects like history; and Group-Investigation to teach such subjects as science labs and social studies concepts.

Intergroup Relations. The effect of cooperative learning strategies on relationships between Black, White, and Hispanic students in desegregated schools is an outstanding case of social psychology in action. While we've gotten students of different ethnicities into the same school buildings, we have a long way to go in having them form friendships and interact on an equal and amicable basis. Numerous studies of friendship between students of different ethnic groups (Gerard and Miller, 1975) have confirmed this observation; students make few friendship choices outside of their own racial or ethnic groups, and this situation does not improve over time of its own accord.

Cooperative learning techniques place students of different races or ethnicities into cooperative groups where each group member is given an equal role in helping the group achieve its goals. These are the conditions of the most widely accepted theory of positive intergroup relations: Allport's Contact Theory of Interracial Relations (1954). Allport's theory holds that if individuals of different races are to develop positive relationships, they must engage in frequent cooperative activity on an equal footing. Put another way, if we assign students to work together on a common task toward a common goal, where each individual can contribute substantially to the mutually desired goal, the students will learn to like and respect one another.

The results of the cooperative learning studies support this expectation. Most of the intergroup relations research has been done with the Student Team Learning methods. Four studies of STAD (Slavin, 1977b; Slavin, 1979; Slavin and Oickle, 1980; Tackaberry, 1980), three of TGT (DeVries, Edwards, and Slavin, 1978), and two of Jigsaw II (Gonzales, 1979; Ziegler, in press) all found positive effects of the Student Team Learning methods on improving relationships between students of different ethnicities. Most of the STAD and TGT studies involved relationships between Blacks and Whites in the East, but the subjects in one STAD study (Tackaberry, 1980) were mostly Puerto Rican, Cuban, and Anglo. Those in one Jigsaw II study (Gonzales, 1979) were Mexican-American and Anglo, while the subjects in another Jigsaw II study (Ziegler, in press) were primarily recent European immigrants and Anglo-Canadians in Toronto.

Two of these studies (Slavin, 1979; Ziegler, in press) included follow-ups of interethnic attitudes. Both found that several months after the students experienced Student Team Learning, they still had significantly more friends outside of their own ethnic groups than did students who had been in traditional classes.

The research on Student Team Learning and intergroup relations has been so consistently successful that many school districts are currently using these methods to improve relationships between Black, White, and Hispanic students with the added advantage of improving student achievement.

Mainstreaming. The barriers to friendship and positive interaction presented by ethnic differences are serious, but they are small compared to the gap between mainstreamed academically handicapped students and their nonmainstreamed classmates. However, this is another area in which cooperation may overcome substantial differences. Several re-

searchers have found that cooperative learning improves relationships between mainstreamed and nonmainstreamed students. In a recent study, Madden and Slavin (1980) found that Student Team Learning helped nonmainstreamed students accept their mainstreamed classmates while also improving the class's achievement and self-esteem. Ballard and others (1977) introduced cooperation between educable mentally retarded students and their nonretarded classmates, and found a marked increase in friendship between the EMR and non-EMR students. Armstrong and others (1977) and Cooper and others (1980) found positive effects of the Learning Together model on acceptance of mainstreamed learning disabled children.

Self-Esteem. Several of the cooperative learning studies have included measures of student self-esteem. Self-esteem has been anticipated as an outcome of cooperative learning both because students in cooperative groups feel more liked by their classmates (which they usually are) and because they are likely to feel more successful academically (which they also usually are).

The technique whose structure is most directly targeted to improving student self-esteem is Jigsaw, in which students are each given special information that makes them indispensable to their groups. Positive effects on self-esteem have been found in two studies of Jigsaw (Blaney and others, 1977; Geffner, 1978), but not in a third (Gonzales, 1979).

TGT and STAD have each documented effects on student self-esteem (DeVries and others, 1979; Oickle, 1980). Also, a study that combined the three Student Learning methods (Slavin and Karweit, 1979) showed positive effects on self-esteem.

Other Effects of Cooperative Learning. The positive outcomes discussed earlier on student learning, intergroup relations, mainstreaming, and self-esteem have been studied most extensively in the cooperative learning research because they are highly important outcomes of schooling. However, there is a wide range of other outcomes that have also been studied in this research (Slavin, in press).

Not surprisingly, most evaluations of cooperative learning have found that students who work together like school more than those who are not allowed to do so. They also like other students more. Students who have worked cooperatively are more likely to be altruistic and to believe that cooperation is good. They are also likely to say they want their classmates to do well in school and that they feel their classmates want them to do well.

One study (Slavin, 1977c) found that emotionally disturbed adolescents who experienced cooperative learning were more likely than traditionally taught students to interact appropriately with other students; this effect was sustained five months after the end of the project. Another study (Bridgeman, 1977) found that students who worked cooperatively were better able than other students to understand someone else's point of view.

Use of Cooperative Learning

Applications of cooperative learning methods in classrooms have increased dramatically over the past three years and continue to increase at a rapid rate. The most widely used methods by far are the Student Team Learning methods, STAD, TGT, and Jigsaw II. At the end of the 1979-80 school year, more than 3,000 teachers located throughout the United States were estimated to be using these methods, and that number was expected to double during this school year, especially as a result of several large-city adoptions of the program. The Johnsons' Learning Together model is also used in many schools, as are the original form of Jigsaw and Group-Investigation, which is widely used in Israel.

Although there are unanswered questions in the research, it is possible to say that the principal cooperative learning methods are effective on a wide range of outcomes. They have proven to be practical and widely acceptable to teachers. The research has clearly shown that changing from a traditional competitive classroom to a cooperative one does not diminish student achievement; often it significantly improves achievement. The research overwhelmingly supports the usefulness of cooperative learning for improving the social outcomes of schooling, such as intergroup relations, attitudes toward mainstreamed students, and general positive relations between students. Cooperative learning also seems to make students feel better about themselves.

Cooperative learning methods can be used by teachers to achieve social and academic goals at the same time, without sacrificing one for the other. The ultimate significance of the research on cooperative learning might be in the development of classroom instructional models in which peer motivation is used to focus students on academic excellence and lead them to learn because it is valued by the peer group rather than reject it because it is imposed by adults. If we can make students true partners in the learning enterprise instead of simply consumers, we may be able to achieve educational outcomes far beyond those now considered possible. ■

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Highlights From Research on Cooperative Learning

Cooperative learning methods are aimed at reducing student isolation and perceived hostile climates that exist in highly competitive classrooms, and at increasing students' ability to interact and work with other students toward common goals.

The most widely used cooperative learning methods include:

- Student Teams-Achievement Divisions (STAD)—Students assemble in teams of four or five members to master worksheets on material covered in a lesson just presented by the teacher. Subsequently, they individually take a quiz on that material. The team's overall score is determined by the extent to which each student *improved* over his or her past performance. The team demonstrating the greatest improvement is recognized in a weekly class newsletter.
- Teams-Games-Tournament (TGT)—The procedure in TGT is the same as that used in STAD, but instead of taking quizzes, the students play academic games with other members in the class whose past performance was similar to their own. The team score is also based on individual improvement.
- Jigsaw—Students meet in five- or six-member teams. The teacher gives each student an item of information which the student must "teach" to the team. Students are then individually tested for their mastery of the material. Jigsaw II is the same, except that students obtain their information from textbooks, narrative material, short stories, or biographies. The class is then quizzed for individual and team scores.
- Learning Together—After the teacher has presented a lesson, students work together in small groups on a single worksheet. The team as a whole receives praise and recognition for mastering the worksheet.
- Group-Investigation—This is a more complex method, requiring students to accept greater responsibility for deciding what they will learn, how they will organize themselves to master the material, and how they will communicate what they have learned to their classmates.

These methods share four positive characteristics. (1) The cooperation required among students prevents one student from doing most of the work for the others. (2) In spite of the cooperative nature of the groups, each student must learn the material in order to improve his or her own score and the team score. (3) Even low achievers who may not contribute greatly can receive recognition since scores are based on individual improvement, however small, over past performance. (4) Students are motivated to cooperate since they receive not just a grade on a piece of paper, but public recognition from the teacher and the class.

Cooperative learning methods have positive effects in several areas. They contribute significantly to student achievement—to an equal extent in both elementary and secondary schools; in urban, suburban, and rural schools; and in diverse subject matter areas.

Schools with racially or ethnically mixed populations do not necessarily have better intergroup relations based solely on student proximity. However, when dissimilar students work together in small groups toward a common goal and are allowed to contribute equally, they will learn to like and respect one another.

Cooperative learning methods also increase acceptance and understanding among educable mentally retarded students, physically handicapped students, and their nonimpaired classmates. They also have a positive effect on student self-esteem.

Students who participate in cooperative learning like school more than their peers who are not allowed to work together; they are better able to interact appropriately with others and to understand another person's point of view.

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Themes of Educational Leadership in 1981–82

Present plans call for the following theme issues of Educational Leadership in 1981–82:

Month	Theme	Including	Deadline for Manuscripts
October	Thinking and Learning	Teaching thinking skills, brain research, development of intelligence, recent learning theory.	June 1, 1981
December	Taking Stock of Your School	Self-assessment of goals, organization, instructional program, school climate, provisions for supervision, community relations.	August 1, 1981
February	Training for Leadership	Leader behavior; selection, training, supervision, and evaluation of administrators.	October 1, 1981
March	Education in Other Nations	Descriptions of developments in other countries—especially curriculum and supervision—relevant to U.S. education.	November 1, 1981

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