

Cooperative Learning: A New Approach

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A recently completed follow-up study of agricultural education graduates at Utah State University underlined the need to teach students transferable as well as technical skills (Nelson and Long, 1988). When asked, "What is the single most important skill or knowledge needed for success in your job?," most respondents cited communication skills. We in vocational agriculture are justifiably proud of the contribution that parliamentary procedure and speech contests make to those important skills, but is it enough? Those students who need this kind of experience the most are often last to volunteer for team practice. Thus, we fine tune the skills of those who are already better able to think on their feet and to communicate rather than those who need such practice most. One obvious recourse is to provide more practice for students in class discussion. Our FFA contests reflect our curriculum as teams are prepared within the classroom. This is good; but traditionally our schools focus on competitive and individualistic student interaction. One extremely useful learning structure often overlooked by vocational educators called "cooperative learning" provides for student interaction in a way that dramatically increases discussion and critical thinking without sacrificing achievement. Cooperative learning is a set of instructional strategies in which students are grouped in teams where they work together toward a common goal.

As explained, the interaction of students planned by the teacher can be categorized as individualistic, competitive, or cooperative. All three are important, but individualistic and competitive student interaction structures are used in most schools. Learning to weld or use a microscope or hammer are skills that can be learned efficiently without interaction among students by providing materials and tools for each student to work alone. Competitive learning can increase scholarship, but excessive competition can reduce motivation, communication, and higher level learning. Schools that evaluate students on the basis of speed and accuracy and grade on the curve find that students succeed, only if others with whom they compete, fail. There is little motivation when so few succeed. Cooperative learning allows students to be successful only if their team members also succeed. They share the same goals and are assigned to small groups for face-to-face discussion. Cooperative learning is effective, yet if such relationships were the only interaction, students may never have the opportunity of independent learning or of competition. A combination of all three forms of student interaction should be practiced.

A Crisis in Achievement

SAT scores indicate that more students are staying in school longer, but they are less well equipped in basic skills than their predecessors (Johnson & Johnson, 1982). Productivity in the United States has lagged behind many other countries. We must invest more in people to derive full benefit from our machines. The economic health and future of America is at stake (Becker, 1975; Schultz, 1981). Substantial numbers of students feel isolated, disconnected from their parents and peers, unattached to school and career, without purpose and direction, and lacking any distinct personal identity. Many are out of touch with the rest of society, unable to build and maintain real connections with others (Johnson & Johnson,

1982). To meet the real needs of our students we must emphasize learning structures that support student learning in agriculture, strengthening the following areas:

1. Develop oral, written, and listening skills.
2. Develop critical thinking competencies and the use of higher level reasoning strategies.
3. Acquire the ability to use knowledge and resources in collaborative activities with other people in their careers, families, communities, and the larger society.
4. Acquire the psychological health and well-being required to participate effectively in our society, insofar as we can help them in the school setting.
5. Develop positive attitudes toward subject areas, such as math and science, so that students are motivated to study these subjects and to learn more about them (Johnson & Johnson, 1984).

One impediment to achieving these goals is that teachers do not believe that they are as important as technical content. Teachers who are told that they should use technical subject matter to teach communication skills too often answer, "I am paid to teach agriculture, not English." Similarly, the teacher who attempts to write test questions that test critical thinking must deal with student frustration. The competitive atmosphere in the classroom does not in my opinion provide positive motivation for most students or an atmosphere conducive to innovation by the teacher. Cooperative education, however, contributes to each of these goals and research has shown results in achievement equal or better than traditional methods (Slavin, 1982).

Job preparation remains an important purpose of vocational agriculture. Most work in agro-industry is done by groups; therefore, industry leaders are structuring group interaction so that group interactions generate innovative ideas. Social psychologists say that creativeness occurs as a result of group activities. The synergistic process that results from decision making and controversy should, I believe, occur more often in our classrooms. Decisions involving alternative solutions creates controversy. In a society which tends to suppress controversy, it is essential that cooperative learning activities teach students how to manage controversy positively (DeCeccio, 1974; Johnson & Johnson, 1985).

Positive management of controversy as a part of decision making and problem solving is important. Vocational agriculture teachers are comfortable with problem solving as it is applied to science in agriculture. Problem solving is cooperative learning but it can be improved by expanding it to include student practice in managing the process. Vocational agriculture teachers typically do a good job of modeling the leadership and management of a problem solving group; cooperative learning theory suggests the student should also be given practice in managing the discussion. Small groups should simultaneously solve the problem and then share their solutions with the total group. In this way, the process can be replicated later without the presence of the teacher.

Johnson and Johnson (1984) note that four basic elements must be included if small group learning is to be truly cooperative. The first is positive interdependence. This interdependence can be realized through (a) mutual goals (goal interdependence); (b) divisions of labor (task interdependence); (c) dividing materials, resources, or information among group members (resource interdependence); (d) assigning students differing roles (role interdependence); and, (e) by giving joint rewards (reward interdependence). A learning situation is cooperative if students perceive that they are positively interdependent with other members of their learning group.

Second, cooperative learning requires face-to-face interaction among students, stimulating discussion and group activities.

The third basic element of cooperative learning is individual accountability for mastering the assigned material. Learning seeks to maximize the achievement of each individual student. Cooperative learning is based on a "we are all in this together" mode that requires each student to take an interest in the individual progress of each team member. Recent formalization of cooperative learning structures has made individual accountability possible. Previous informal cooperative learning in laboratory settings did not prevent goldbricking and hitchhiking on someone else's work.

Finally, cooperative learning requires that students appropriately use interpersonal and small-group skills. Students must be motivated to learn the social skills needed for collaboration. They must also learn how to evaluate the process used in these small-group sessions and reflect upon how well the process worked in addition to whether answers to problems were produced.

It is a mistake to assume students have the social skills necessary to work effectively in cooperative settings. A high level of cooperation is necessary to operationalize cooperative learning. The following can improve cooperation:

- (a) encourage everyone in the group to participate;
- (b) have each member explain how to get the answer;
- (c) check to make sure everyone in the group understands the material;
- (d) listen accurately to what all group members are saying;
- (e) encourage each member to be persuaded by logic of answers proposed, not by group pressure; majority rule does not promote learning;
- (f) criticize ideas, not people; and,
- (g) ask each member to relate what is being learned to previous learning (Johnson & Johnson, 1984).

Vocational agriculture can provide the mechanism for teaching these socially useful skills. We must move beyond the formal group processes represented by parliamentary procedure. Informal group decision-making processes should require consensus rather than concurrence processes. Consensus seeking involves informal give and take that requires everyone's participation, and support of logical argument and constructive criticism of ideas, not people. Encouraging debate only until majority agreement is reached (concurrence) may be adequate for decisions that require little commitment for their implementation, but consensus reached by full and free debate that encourages the expression of differences of opinion so that minority viewpoints are expressed, results in the kind of participative decision-making necessary for cooperative learning to be effective. (See "Learning Together", by Johnson & Johnson, and others for a good

description of seven kinds of decision making.) This kind of group process training is vital for making the democratic decisions for citizenship and team work required in industry. With 70 to 80 % of jobs today requiring a complex coordination of efforts and ideas (Cohen, 1973; Naisbitt, 1982; Shallcrass, 1974), our society should become better at synthesizing cooperative and individualistic approaches in education to provide a more adaptive preparation for the new world of work.

A classroom does not have the same emotional basis for unity and cohesion provided by kinship or community ties. Teachers need to establish a basis for class identity and bonding that will serve as a foundation for cooperative class efforts, (Graves, N.B., & Graves, T.D., 1985, p. 421). The Future Farmers of America Chapter can provide opportunities for group identity and a beginning of bonding.

Implementing Cooperative Learning

The interdependence needed for cooperative learning requires team-building in order to obtain the between-member respect and trust necessary for consensus seeking to succeed. The question then becomes "What is necessary for change from individuals working for their own personal goals (independence) to members of study groups who find satisfaction in being part of a good group performance (interdependence)? Lasting changes are slow and require adequate time and adequate initial effort, coupled with patience. Team building provides insurance that the beginning effort will be positive.

Not all team building involves academic work. Many content-related team building activities serve the dual purposes of uniting the team and providing a setting for lessons. The amount, type, and timing of team building depends on the task, the needs and characteristics of the students, and the values of the teacher (Kagan, 1987). Five aims of team building are: (a) getting acquainted, (b) team identity building, (c) experiencing mutual support, (d) valuing individual differences, and, (e) demonstrating synergy (Kagan, 1988).

This introduction to cooperative learning will examine synergy and the first two aims briefly. Refer to Kagan (1988) for further information on the third and fourth items.

"Getting acquainted" can be accomplished by a variety of interview techniques. One interesting technique is to ask three questions of each team member:

What is something about yourself that most people know?

What is there about you that few people know?

What is one thing about you that no one in this class knows?

Team members share these three items of information with each other as a beginning step in team building.

Team identity building begins when teams are first formed by choosing a team name. There are three simple rules that groups should follow when choosing a name: (a) each team member must have a say; (b) no decision can be reached unless every consents; and, (c) no member consents to the group decision if he has a serious objection. These rules establish the tone for future group processes. Team building continues when cooperative learning techniques such as "Roundtable" and "Sharearound" are used. Both techniques have students take turns contributing answers to a problem, or building on the previous idea or product of their teammates. Roundtables

provide a means for written communication. There is usually one piece of paper and one pen for the group. One student contributes and then passes paper and pen to another student. The paper and pen literally goes around the table. If the contributions are oral, the procedure is called Share-around. Examples of topics which might be used with these techniques include: (a) list feed nutrient requirements; (b) name breeds of poultry, dairy, or beef; and, (c) change one letter at a time in core words and see how far they can go (first person writes FUN, next writes FAN, next FAT, etc.)

Synergy refers to the increased energy released when individuals are working in cooperation. Kagan (1988) notes that "because of synergy the group product can be better than the sum of the individual products of members working alone, and can be far better than the product of even the best individual working alone" (p. 65). Commonly used group exercises such as "Lost in the Desert" are often useful in convincing students that group processes excel individual decision making when done skillfully.

Trust and confidence among team members are important to the success of cooperative learning or any problem solving group. Team building exercises are important and must not be overlooked. In addition, the incentive system and the very structure of the instructional environment must be changed for effective cooperative learning.

A Different Incentive System

Competitive learning dictates that a student succeeds only if those he/she competes with fail. The motivation level possible through using cooperative learning in our schools can be compared to a team effort in athletics where each team member is an important contributing member. Cooperative learning emphasizes the team while maintaining records of individual progress. The team score is generated by individual improvement points based on individual's previous achievement. For example, Robert's base is computed as an average of prior quiz scores less 5 points. Each point above that base score earns an improvement point up to a maximum of ten. Improvement points contribute to team points and team competition is emphasized. If Robert has three quizzes of 68, 70, and 72, his average score is 70. Subtract 5 points for a base score of 65; his next score is 71, thus earning 6 improvement points for his team. The good student with an 98 average is provided incentive in that a perfect score earns the maximum, ten points. This scoring system helps each team member feel that they can contribute to team success on an equal basis.

Base scores are recomputed, averaging the old base score and any quiz scores since the last base. For example, if there were two new quiz scores, the base score would be recomputed as follows:

$$\begin{aligned} &(\text{Old Base} + \text{Last Quiz} + \text{Next-to-last Quiz}) : -3 \\ &65 + 70 + 63 = 198 / 3 = 66 : -5 = 61, \text{ New Base Score} \end{aligned}$$

Students will try hard to meet the achievement and behavior norms of your classroom if those behaviors are associated with meaningful special recognition. Either a recognition ceremony or a team standings chart is satisfactory. A weekly recognition bulletin can also provide recognition. Team recognition receives the priority, but individual growth should also be recognized.

Specialized Structures of Cooperative Learning

Informal cooperative learning structures, such as loosely organized groups working in a vocational agricultural laboratory, do not provide sufficient structure to achieve the potential of cooperative learning. Slavin, at John Hopkin's University, developed Student Teams-Achievement Divisions (STAD). In STAD, students are assigned to four-of-five member learning teams. The heterogeneous teams are made up of high-, average-, and low-performing male and female students, of different racial and ethnic backgrounds; each team represents the entire class. Each week the teacher introduces new material in a lecture or discussion. The team members study worksheets on the material. The teams may work together or as individuals, take turns quizzing each other, discuss problems, or use whatever means they wish to employ to master the material. Team members are told that they are not finished studying until all teammates understand the material.

When ready, students take quizzes on the materials. They do not help each other, thus, individual accountability is established. The teacher scores the tests and then formulates improvement points and team scores.

Another form of cooperative learning is Jigsaw which was originally designed by Elliot Aronson and his colleagues at the University of Texas and then at the University of California at Santa Cruz. Students are assigned to different academic material, which they then teach to the team. Each team member reads his or her unique section and then meets as an "expert" with members of other teams who have studied the same sections to discuss the material and how they will teach it. Then the students return to their teams and take turns teaching their teammates. Students can learn those sections only by listening carefully to teammates, which motivates them to support and show interest in each other's work.

Slavin modified Jigsaw and then incorporated it into the Student Team Learning Program. This method, called Jigsaw II, requires students to work in four- or five-member groups; but, instead of assigning a section to a student, all students read a common narrative, such as a book chapter, a short story, or biography. Each student is then assigned a topic on which to become an expert. This format does not require teachers to make instructional materials, which can be a problem with Jigsaw I. Expert sheets designed by the teacher assign individuals to topic areas for detailed study. Like Jigsaw I, then experts study, meet to discuss their area with other experts who have been assigned the same topic, and return to teach this information to their teams. This method prevents goldbricking and still requires individual achievement testing and team scores, which are derived from base scores for each student and improvement points. Again, like STAD, a weekly news article or recognition day reinforces team competition.

Team Tournament Games are identical to STAD except quizzes are replaced with academic game tournaments. Individual improvement scores are replaced with a bumping system so students of similar ability compete for points for their team. Question cards are drawn. If the person who draws the question cannot answer correctly, the next person in rotation tries the question. The person who answers correctly keeps the card. At the end of the game the person with the most cards makes the most improvement points for his/her team. Every two weeks, students are bumped up or down according to their performance in order to equalize competition.

Other types of cooperative learning, such as Coop-Coop and Team Assisted Individualization (TAI), offer alternative structures and more flexibility. (See "Cooperative Learning Resources for Teachers," by Spencer Kagan for information regarding these variations as well as instruction for team building exercises.)

Conclusion

Our traditional learning structures assume that it is a dog-eat-dog world and that schools should simulate such an environment. Proponents of cooperative learning say that competition can be overemphasized and that many human endeavors involve cooperation. We live in an interdependent world with an economic system characterized by an elaborate division of labor. We live in families and communities in which cooperation is essential to meet our common interests.

The level of participation required in cooperative learning groups involves a fruitful exchange of ideas, opinions, conclusions, theories, and information of members. Managed skillfully, such an exchange improves motivation to achieve, enhances learning and fosters understanding.

Discussion among students is of inestimable value. The oral repetition of information enhances the integration of information, provides rationale for its retention, and facilitates long term retention of the information; it generally increases achievement (Johnson & Johnson, 1982).

Social gains result from cooperative learning. The technique promotes peer regulation, feedback, support, and encouragement of learning. Such peer academic support is unavailable in competitive and individualistic learning situations. Students who work together in such a supportive atmosphere tend to like each other. Their collaborative efforts appear to have a positive impact on learning even when discussion does not occur.

Classrooms should be dominated by cooperative learning activities in order to make schools more relevant. When the overriding environment in our classrooms is cooperative, competition provides an interesting nonthreatening change of pace. Occasional use of competition in a predominantly cooperative setting would reduce the fear presently experienced by many students and could dramatically increase student motivation. Individual learning will happen naturally as students divide the labor and contribute to the groups' shared goals.

Cooperative learning is said to be used by an estimated 20,000 teachers located in every state and in many foreign countries (Slavin, 1983). Because our purposes in vocational education include preparation for work as well as for life, it is important that we utilize this valuable learning structure.

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