The Structural Approach to Cooperative Learning

Teachers who are well versed in a variety of team structures can create skillful lessons that engage and enlighten their students.

The structural approach to cooperative learning is based on the creation, analysis, and systematic application of *structures*, or content-free ways of organizing social interaction in the classroom. Structures usually involve a series of steps, with proscribed behavior at each step. An important cornerstone of the approach is the distinction between "structures" and "activities."

To illustrate, teachers can design many excellent cooperative *activities*, such as making a team mural or a quilt. Such activities almost always have a specific content-bound objective and, thus, cannot be used to deliver a range of academic content. In contrast, *structures* may be used repeatedly with almost any subject matter, at a wide range of grade levels, and at various points in a lesson plan. To illustrate further, if a teacher new to cooperative learning learns five activities, he or she might well report back after a week, "Those worked well, but what should I do next week?" If, instead, the teacher learns five structures, he or she could meaningfully include cooperative learning in lessons all year to further the academic progress of students in any subject matter.

Structures differ in their usefulness in the academic, cognitive, and social domains, as well as in their usefulness in different steps of a lesson plan.

Accordingly, structures can be combined to form "multistructural" lessons in which each structure—or building block—provides a learning experience upon which subsequent structures expand, leading toward predetermined academic, cognitive, and social objectives.

Competitive vs. Cooperative Structures

In teaching, new structures continue to be developed, and old structures continue to evolve. They are based on distinct philosophies of education and lead to variations in types of learning and cooperation, student roles and communication patterns, teacher roles, and evaluation (Kagan 1985). There are several dozen distinct structures, some with adaptations, such as the half dozen major variations on Jigsaw (Kagan 1989). Among the most well-known structures are Jigsaw (Aronson et al. 1978); Student-Teams Achievement-Divisions, or STAD (Slavin 1980); Think-Pair-Share (Lyman 1987); and Group-Investigation (Sharan and Hertz-Lazarowitz 1980).

One of the most common structures teachers use is a competitive structure called Whole-Class Question-Answer (see fig. 1). In this arrangement, students vie for the teacher's attention and praise, creating negative interdependence among them. That is, when the teacher calls

Fig. 1. Whole-Class Question-Answer

1. The teacher asks a question.
2. Students who wish to respond raise their hands.
3. The teacher calls on one student.
4. The student attempts to state the correct answer.

Fig. 2. Numbered Heads Together

1. The teacher has students number off within groups, so that each student has a number: 1, 2, 3, or 4.
2. The teacher asks a question.
3. The teacher tells the students to "put their heads together" to make sure that everyone on the team knows the answer.
4. The teacher calls a number (1, 2, 3, or 4), and students with that number can raise their hands to respond.

on one student, the others lose their chance to answer; a failure by one student to give a correct response increases the chances for other students to receive attention and praise. Thus, students are set against each other, creating poor social relations and peer norms against achievement.

In contrast to the competitive Whole-Class Question-Answer structure stands Numbered Heads Together, a simple four-step cooperative structure (see fig. 2). Numbered Heads includes teams, positive interdependence, and individual accountability, all of which lead to cooperative interaction among students. Positive interdependence is built into the structure: if any student knows the answer, the ability of each student is increased. Individual accountability is also built in: all the helping is confined to the heads together step; students know that once a number is called, each student is on his or her own. The high achievers share answers because they know their number might not be called, and they want their team to do well. The lower achievers listen carefully because they know their number might be called. Numbered Heads Together is quite a contrast to Whole-Class Question-Answer in which only the high achievers need participate and the low achievers can (and often do) tune out.

Why So Many Structures?

As I mentioned, there are a number of different structures, as well as variations among them. This variety is necessary because the structures have different functions or domains of usefulness.

To illustrate, let's contrast two similar simple structures, Group Discussion and Three-Step Interview (see fig. 3). In Group Discussion, there is no individual accountability; in some groups some individuals may participate little or not at all. Also, there is no assurance that team members will listen to each other: in some groups all the individuals may be talking while none are listening. Further, at any one moment, if one person at a time is speaking, one-fourth of the class is involved in language production.

In contrast, in Three-Step Interview, each person must produce and receive language; there is equal participation; there is individual accountability for listening, because in the third step each student shares what he or she has heard; and for the first two steps, students interact in pairs, so one-half rather than one-fourth of the class is involved in language production at any one time.

Thus, there are profound differences between apparently similar simple cooperative structures. Group Discussion is the structure of choice for brainstorming and for reaching group consensus; Three-Step Interview is far better for developing language and listening skills as well as promoting equal participation. When the teacher is aware of the effects of different structures, he or she can design lessons with predetermined outcomes.

Turning to more complex structures, the differences are even greater. For example, Co-op Co-op (Kagan 1985a) is a 10-step structure in which students in teams produce a project that fosters the learning of students in other teams. Each student has his or her mini-topic, and each team makes a distinct contribution toward the class goal. The structure involves higher-level thinking skills, including analysis and synthesis of materials. Like all structures, however, Co-op Co-op is content-free. For example, when it is used in university classrooms, students may work 10 weeks to complete a sophisticated audiovisual presentation, whereas in a kindergarten classroom, a project might culminate in a 20-minute presentation in which each student on a team shares with the class one or two new facts he or she learned about the team animal. Whether the projects are brief or extended, the content complex or simple, the students in kindergarten or college, the 10 steps of Co-op Co-op remain the same.

Likewise, different structures are useful for distinct objectives such as teambuilding, classbuilding, communication building, mastery, and concept development. Among those structures used for mastery, there are further important distinctions. For example, Color-Coded Co-op Cards are designed for efficient memory of basic facts; Pairs Check is effective for mastery of basic skills; and Numbered

Fig. 3. Group Discussion vs. Three-Step Interview

Group Discussion	Three-Step Interview
Steps in the Process:	
1. The teacher asks a low-consensus question. 2. Students talk it over in groups.	1. Students form two pairs within their teams of four and conduct a one-way interview in pairs. 2. Students reverse roles: interviewers become the interviewees. 3. Students roundrobin: each student takes a turn sharing information learned in the interview.
Characteristics:	
• Unequal participation • Not all participate • No individual accountability • 1/4 of class talking at a time	• Equal participation • All participate • Individual accountability • 1/2 of class talking at a time

Fig. 4. Overview of Selected Structures

Structure	Brief Description	Functions Academic & *Social*
	Teambuilding	
Roundrobin	Each student in turn shares something with his or her teammates.	Expressing ideas and opinions, creation of stories. *Equal participation, getting acquainted with teammates.*
	Classbuilding	
Corners	Each student moves to a corner of the room representing a teacher-determined alternative. Students discuss within corners, then listen to and paraphrase ideas from other corners.	Seeing alternative hypotheses, values, problem-solving approaches. *Knowing and respecting different points of view, meeting classmates.*
	Communication Building	
Match Mine	Students attempt to match the arrangement of objects on a grid of another student using oral communication only.	Vocabulary development. *Communication skills, role-taking ability.*
	Mastery	
Numbered Heads Together	The teacher asks a question, students consult to make sure everyone knows the answer, then one student is called upon to answer.	Review, checking for knowledge, comprehension. *Tutoring.*
Color-Coded Co-op Cards	Students memorize facts using a flash card game. The game is structured so that there is a maximum probability of success at each step, moving from short-term to long-term memory. Scoring is based on improvement.	Memorizing facts. *Helping, praising.*
Pairs Check	Students work in pairs within groups of four. Within pairs students alternate—one solves a problem while the other coaches. After every two problems the pair checks to see if they have the same answers as the other pair.	Practicing skills. *Helping, praising.*
	Concept Development	
Three-Step Interview	Students interview each other in pairs, first one way, then the other. Students each share with the group information they learned in the interview.	Sharing personal information such as hypotheses, reactions to a poem, conclusions from a unit. *Participation, listening.*
Think-Pair-Share	Students think to themselves on a topic provided by the teacher; they pair up with another student to discuss it; they then share their thoughts with the class.	Generating and revising hypotheses, inductive reasoning, deductive reasoning, application. *Participation, involvement.*
Team Word-Webbing	Students write simultaneously on a piece of chart paper, drawing main concepts, supporting elements, and bridges representing the relation of ideas in a concept.	Analysis of concepts into components, understanding multiple relations among ideas, differentiating concepts. *Role-taking.*
	Multifunctional	
Roundtable	Each student in turn writes one answer as a paper and a pencil are passed around the group. With Simultaneous Roundtable more than one pencil and paper are used at once.	Assessing prior knowledge, practicing skills, recalling information, creating cooperative art. *Teambuilding, participation of all.*
Inside-Outside Circle	Students stand in pairs in two concentric circles. The inside circle faces out; the outside circle faces in. Students use flash cards or respond to teacher questions as they rotate to each new partner.	Checking for understanding, review, processing, helping. *Tutoring, sharing, meeting classmates.*
Partners	Students work in pairs to create or master content. They consult with partners from other teams. They then share their products or understanding with the other partner pair in their team.	Mastery and presentation of new material, concept development. *Presentation and communication skills.*
Jigsaw	Each student on the team becomes an "expert" on one topic by working with members from other teams assigned the corresponding expert topic. Upon returning to their teams, each one in turn teaches the group; and students are all assessed on all aspects of the topic.	Acquisition and presentation of new material, review, informed debate. *Interdependence, status equalization.*
Co-op Co-op	Students work in groups to produce a particular group product to share with the whole class; each student makes a particular contribution to the group.	Learning and sharing complex material, often with multiple sources; evaluation; application; analysis; synthesis. *Conflict resolution, presentation skills.*

Heads Together is designed for review or checking for comprehension. A list of major structures and their functions is presented in Figure 4 (See Kagan 1989 for details about the structures in the figure as well as others).

Structures differ also in their usefulness in the academic, cognitive, and social domains, as well as in their usefulness in different steps of a lesson plan. The most important considerations when determining the domain of usefulness of a structure are:

1. What kind of cognitive and academic development does it foster?
2. What kind of social development does it foster?
3. Where in a lesson plan does it best fit?

To illustrate the distinct domains of usefulness of different structures, let's contrast Color-Coded Co-op Cards and Three-Step Interview (see fig. 5). Color-Coded Co-op Cards work well for convergent thinking (knowledge-level thinking), such as when the academic goal is memorization of many distinct facts; the Co-op Cards promote helping and are most often used for practice. Three-Step Interview does not serve any of those goals well. In contrast, Three-Step but not the Co-op Cards is most often used for divergent thinking (evaluation, analysis, synthesis, and application-level thinking), such as when the academic goal is promoting thought as part of participation in the scientific inquiry process or as part of the writing process; Three-Step Interview promotes listening skills and serves well to provide an anticipatory set for the lesson ("What would you most like to learn about . . . ?" or "What do you now know about . . . ?") or to obtain closure ("What is the most important thing you have learned about . . . ?" "If we had more time, what aspect of . . . would you like to study further?").

Because each structure has distinct domains of usefulness and can more efficiently reach some but not other cognitive, academic, and social goals, the efficient design of lessons involves using a variety of structures, each chosen for the goals it best accomplishes. Reliance on any one structure limits the cognitive and social learning of students.

Fig. 5. Contrasting Domains of Usefulness

	Color-Coded Co-op Cards	Three-Step Interview
Academic & Cognitive	Memory of basic facts and information	Evaluation, analysis, synthesis, application
Social	Helping, praising	Listening
Steps in Lesson Plan	Practice	Anticipatory set, closure

The Multistructural Lesson

A cooperative learning teacher fluent in many structures can competently move in and out of them as needed to reach certain learning objectives. Such a multistructural lesson, for example, might begin with content-related class-building using a Line-up, followed by content-related teambuilding using Round Table. The lesson might then move into Direct Instruction, followed by Partners for information input. To check for comprehension and emphasize key concepts, the teacher would shift into Numbered Heads Together. Next might come Group Discussion or Team Word-Webbing for concept development, followed by a Cooperative Project. No one structure is most efficient for all objectives, so the most efficient way of reaching all objectives in a lesson is a multistructural lesson.[1]

Whether the objective is to create a poem, write an autobiography, or learn the relationship of experimental and theoretical probability, the teacher's ability to use a range of structures increases the range of learning experiences for students, resulting in lesson designs that are richer in the academic, cognitive, and social domains. By building on the outcomes of the previous structures, the teacher is, thus, able to orchestrate dynamic learning experiences for students.

All Together, a Structure a Month

For schools and districts conducting training for cooperative learning, there are advantages in the structural approach. Whereas it can be quite overwhelming for teachers to master "cooperative learning," it is a relatively easy task to master one structure at a time.

Many schools and districts have adopted a "structure of the month" strategy in which site-level trainers introduce the structure, provide demonstration lessons, and lead participants in planning how to adapt the structure to their own classroom needs. When many teachers at a site are all working to learn the same structure, there is a common base of experience, promoting formal and informal collegial coaching and support.□

[1]Two recent books illustrate how teachers can use multistructural lessons to reach a wide range of academic objectives: B. Andrini, (1989), *Cooperative Learning and Math: A Multi-Structural Approach* (San Juan Capistrano, Calif.: Resources for Teachers); and J.M. Stone, (1989), *Cooperative Learning and Language Arts: A Multi-Structural Approach* (San Juan Capistrano, Calif.: Resources for Teachers).

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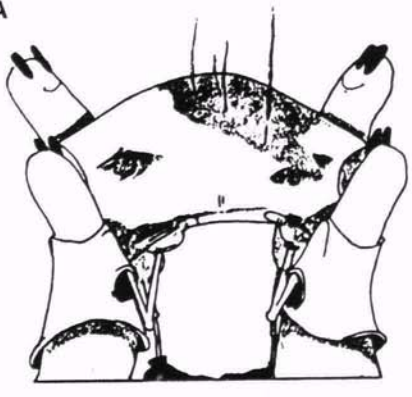

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