

Cooperative Learning

(Note: All figures and tables are located at the end of this article.)

Guiding Questions

After reading this article section you should be able to answer the following questions:

1. What is cooperative learning?
2. What does a cooperative learning lesson look like?
3. How can I utilize computer and other technologies with cooperative learning?
4. Why does cooperative learning work?
5. What are the typical learning outcomes for cooperative learning?
6. How can I use technology to help me assess learning for cooperative learning?
7. How can I shape and refine my use of cooperative learning?

What is Cooperative Learning?

Cooperative learning refers to methods of instruction that organize classroom instruction so that groups of 2-6 students work together to reach a common goal. Cooperative learning involves all group members who share in process, content, and accountability. Perhaps one way to envision cooperative learning is to look at the three most common types of classroom organization.

Classroom learning environments around the world generally fit into three social categories: competitive, individualistic, or cooperative (Johnson, Johnson, & Holubec 1994). Competitive classrooms are based on the concept of ranking. Performance indicators are used to differentiate among individual students. Only one student can be at the head of the class. Therefore, for me to do my best I must find ways to get ahead of you and everyone else. My success depends on your failure. Medical schools are a classic example where this environment is found.

In the individualistic classroom, standards for success are clearly communicated. The success or failure of any one student depends on that student's individual actions. It is possible for two or more students to be at the head of the class. However, my success has no connection

to your success or failure. I can succeed or fail and you can succeed or fail, but there is no correlation between the two. Many high schools use this approach for calculating standing in the graduating class.

The cooperative classroom ties my success to your success. There is no way I can succeed if you fail and there is no way you can succeed if I fail. In the cooperative classroom the achievement focus shifts from the individual to the group. The most refreshing and affirming thing about the cooperative classroom is that when the focus shifts from the individual to the team, individual learning is enhanced, not diminished (Marzano, 2003; Marzano, Pickering, & Pollock, 2001; Slavin, 1995, 1996).

Approaches to cooperative learning vary among its major proponents, yet all major approaches still contain certain common characteristics:

- the use of teams for learning,
- training students to function in teams,
- designing learning activities which “require” students to function in teams but still remain responsible as individuals, and
- the simultaneous, active engagement of the majority of students in the class.

What does a Cooperative Learning Lesson Look Like?

Cooperative learning is perhaps the most researched and most misunderstood teaching methodology in the past 30 years (Marzano, 2003; Marzano, Pickering, & Pollock, 2001; Ellis & Fouts, 1997; Slavin, 1995). Since the research literature clearly indicates the efficacy of cooperative learning for student learning and development, it is one of the most touted teaching methods. Some administrators and teachers, feeling professional pressure to use this research-based teaching strategy, try to implement cooperative learning without adequate training. As a

result, students are given “group work” assignment labeled as cooperative learning. These students, teachers, and administrators then grow dissatisfied with the results of their “cooperative learning” experience. These individuals are often “inoculated” against cooperative learning on the basis of their exposure to group work. Perhaps you are one of those individuals who was turned off to cooperative learning by group work assignments that fell on your shoulders to complete.

What then does authentic cooperative learning look like? How can a teacher know if she is truly implementing cooperative learning and not just assigning group work? Cooperative learning is defined in terms of necessary classroom conditions and essential elements, which can be thought of as principles of interaction (Kagan, 1997; Johnson, Johnson, & Holubek, 1994; Slavin, 1996). The classroom conditions necessary to implement Cooperative Learning include organizing your classroom for teams and organizing your students in teams. The essential elements of cooperative learning (Johnson, Johnson, & Holubec, 1994) are positive interdependence, individual accountability, group processing, social skills, and face-to-face interaction (see Figure 1 for a mnemonic to help you remember these essential elements). As with other teaching strategies, you assess your implementation by reflecting on the critical attributes. If one or more of the critical attributes are missing in your lesson, then you are not using cooperative learning but group work.

Once the necessary classroom conditions are created, the critical attributes of cooperative learning can be integrated into a variety lesson designs. This section of the articel presents the classroom conditions, the critical attributes, and simple cooperative structures for implementing Cooperative Learning.

First classroom condition: Classroom Organized for Teams

The typical classroom, with its discrete rows of desks and maximum distance between students, is not organized for cooperative learning. It is difficult for two students to cooperate when they are sitting in their individual desks with maximum distance between them.

Round tables are the preferred furniture for cooperative learning classrooms rather than individual desks. Tables are designed for groups; desks are designed for individuals. Round tables, as illustrated in the story of King Arthur, communicate equality of group membership. No one sits at the “head” of the table and thus assumes the “headship” of the team. However, in reality, you may not have round tables available or funds to purchase them.

If round tables are not an option, clusters of desks can be used to get students close enough to one another to cooperate. How you organize your classroom will most likely depend on how often it is your classroom. If you use the same classroom all day, then you will probably have flexibility in organizing the physical spaces in your classroom. If you have to share a classroom with one or more teachers, you may run into challenges.

You may arrange the desks in your classroom into permanent “clusters” of 2, 3, or 4 desks each. The students would always sit in their cooperative teams even when doing individual work. Another option, for teachers who share classrooms or do not want students seated in groups all the time, is to teach your students to move their desks into and out of clusters each class period or for each cooperative activity. With proper training on the “desk switch” procedure, your students will be able to quickly and quietly move their desks into cooperative teams at the beginning of an activity and back into their individual positions at the end of an activity.

Whether you use permanent clusters or have students shift their seating arrangement according to activity, it is critical that you have your classroom arranged so that you can “work the crowd” (Jones, 2000). If any team is at the perimeter of your classroom and inaccessible to the teacher, you can almost bet that your problem students will find a way to get themselves into that team. See Chapter 8 of the companion book for examples of floor plans for arranging classrooms to facilitate behavior management.

Second classroom condition: Students Organized in Teams

Before cooperative learning can occur, students must be organized into cooperative teams. Use of teams in the classroom allows teachers to implement the concept of simultaneous interaction to increase student time-on-task and classroom efficiency. Typical classroom interaction proceeds in this manner: teacher poses question, students raise hands, teacher selects one student, and that student gives a response. With students organized in teams the teacher can pose a question and have half the students in the class answer simultaneously by responding to a partner. The concept of simultaneous interaction extends to other classroom activities such as distributing supplies, sharing ideas in a group discussion, and sharing team reports. These activities can all be done simultaneously when your classroom is functioning in groups (Kagan, 1997).

There are different types of cooperative teams and many ways to form them. The type of team being formed and the purpose of the team help to determine the appropriate technique to use for team formation.

There are two basic types of teams: formal cooperative groups and informal cooperative groups (Johnson, Johnson, & Smith, 1998). *Formal cooperative groups* are teams that are formed to function across an extended period of time. This can be for several class periods,

several weeks, or even a school term. Formal cooperative groups are sometimes known as base groups, family groups, or home teams. These teams are designed as the primary sites for cooperation in the classroom. While students may sometimes work alone or with other individuals, the majority of cooperative activity happens in the formal cooperative group.

Informal cooperative groups are teams formed to last for a short time and for a specific purpose groups (Johnson, Johnson, & Smith, 1998). Examples include interest groups, skill groups, and work groups (Kovalik with Olsen, 1997). Students who share common interests or who choose to work together on a specific topic form interest groups (see “Groups of Choice” below). Students who need to work on the same academic skills are placed together in skill groups. Work groups are responsible for completing classroom business. Classroom business can include emptying trash, cleaning cages, watering plants, and other classroom “jobs.”

Within a single classroom and within a single day, teachers may make use of both formal and informal cooperative teams. This practice is known as *flexible grouping* and allows teachers to make strategic decisions about teams on the basis of her instructional goals.

Cooperative teams may be formed randomly or purposively. Random techniques are used when there are no important criteria to guide team formation. Random techniques are often used to create teams that will function for only a short time (a class period for example), with students who are experienced with cooperative learning, or with more mature students. Purposive techniques for team formation are typically used to create teams that are diverse in membership, teams that will function for longer periods of time, or teams that will focus on specific content.

Techniques for forming random teams

“Tokens” – One approach to forming random teams is to randomly distribute some form of “token” that is used to indicate team membership. Tokens can be colored dots, colored cards, colored balloons, shaped balloons, pieces of a photo cut into puzzle shapes, or playing cards.

“Hum-dingers” – Another technique the author likes to use is called “Hum-dingers.” With “Hum-dingers,” students are given the introductory measures of well-known songs (notes only, no words). Without speaking, the students begin humming their tunes and searching for others with the same melody. When students find others with the same melody they continue their searching and humming until they find all of their team members.

“Line-ups” – Line-ups work particularly well with larger groups that need to be organized in to cooperative teams fairly quickly. Typical line-ups include organization by birthday, by height, and by location of birth (east to west). After students arrange themselves in the correct order without talking, the teacher then divides the line into teams of three to six persons in one of three ways. One approach is to begin at one end of the line and simply count the number of students you want to be in a group, for example three persons, and have those students form a team. The teacher continues counting off groups of three students to create the rest of the teams. A second approach is to have the teacher count off the students to form the correct number of teams. For example, if you need to form eight teams, number off the students from one to eight beginning with the first person in line. Then all students with number one form a team, students with number two form a team, and so on. A third approach is to break the line in the middle and either fold or slide one half of the line so that each student is facing another person. When teams of two are needed, the persons facing one another form a team. If larger teams are needed, pairs combine to form teams of four or six.

Techniques for forming purposive teams

Most cooperative teams used in the classroom setting will be formed in a more purposive manner. Intelligent team formation is critical to classroom management and classroom learning.

“Team formation wheels” – To create team formation wheels first cut four circles of slightly different sizes. These four circles are then connected with a brad pushed through the centers. To create heterogeneous teams based on achievement, write the names of your low-achieving students in the sections of the center circle. Write the names of your high-achieving students on the segments of the outer circle. Write the names of middle-achieving students on the segments on two inner circles. To form teams, first align the segments from all four circles and use the names that appear in line with one another. When time comes to form new teams, the center circle remains stationary while the other circles are rotated. New teams are indicated in segments again, but no previous team members are included in the same group again due to the rotation of the circles. If criteria other than achievement are important in your team formation (for example, language fluency), those criteria should be used when ranking students on the circles (Kagan, 1997).

“Rank-order” – Another approach for forming teams with diverse student composition requires the teacher to first list all students on the basis of achievement. While the exact ranking is not critical, it is important that the teacher differentiate between high, middle, and low achievers. Form teams by selecting one student from the high achieving group, two from the middle group, and one from the low achieving group. When selecting students for teams, take care to create as much diversity on the team as possible in terms of ethnicity, language, and gender. Continue assigning students to groups of four using the formula of one high-achiever, two middle-achievers, and one-low achiever for each team (Kagan, 1997).

“Groups of Choice” – Sometimes teachers allow students to work in groups composed of members who are self-selected. The impetus for team formation is often a topic of study that is of interest to all team members. The caveat in forming groups of choice is that students will sometimes identify a topic as being of interest simply so he may be in the same group as a friend. It is imperative that the interaction principles listed below are operational before forming “groups of choice.”

Essential Element 1: Positive Interdependence

One of the core interaction principles of cooperative learning is “positive interdependence.” Positive interdependence refers to the condition that exists when team members *need* to work together in order to be successful in completing assigned learning tasks. If positive interdependence is present, it will not be easier or more meaningful for individuals to complete the task alone. While it is possible for cooperative learning to achieve a minimal level of functioning with weaknesses in teams, group processing, or social skills, it will FAIL without **positive interdependence** and **individual accountability** (Marzano, 2003; Marzano, Pickering, & Pollock, 2001; Ellis & Fouts, 1997; Shavin, 1996).

Tools & techniques for promoting positive interdependence

Positive interdependence can be designed into cooperative learning lessons through a variety of techniques.

“Resource interdependence” – Resource interdependence refers to the practice of limiting the resources available to a team in order to heighten the need for collaboration. Resource limitation is most commonly accomplished by providing each team with only one ‘piece’ of each

‘resource’ needed to complete the assigned task. Examples of ‘resources’ include required readings, art materials, visual materials, and project supplies.

“Role interdependence” – Another technique that helps team members need one another is assigning roles. This technique works on the concept of ‘division of labor.’ One team member may be designated the “Recorder” and be responsible for writing down the required information. Another team member may be designated the “Reporter” and be responsible for presenting the teams ideas orally to the class. Many roles are possible. To make role interdependence work, the teacher must ensure that the roles assigned to the team members are necessary for the tasks at hand and that team members know how to fulfill the roles.

“Reward interdependence” – While some educational thought-shapers rage against the use of “rewards” in the classroom (Kohn, 1999), many teachers find that in the real world of the classroom rewards are sometimes very practical tools. The art to using rewards in the classroom is finding the balance. We do not want to smother intrinsic motivation, but at the same time we do want to motivate all students and celebrate their successes.

If you decide to use rewards to foster positive interdependence in your classroom, there are guidelines to follow. First, don’t abuse rewards by using them too often. Rewards work best when used infrequently. Second, teams, not individuals, earn rewards. If a team earns a reward, all team members receive the reward. You defeat your intent of building positive interdependence when you disqualify a team member from the reward her team has achieved. Third, if a reward is offered in a cooperative classroom, then all teams should have the opportunity to earn it. Use criteria established by the teacher or the students, such as minimum quality standards or a required timeframe for completion, to evaluate team assignments and grant the promised reward to all teams who meet the criteria.

“Goal interdependence” – Having everyone on a team working for the same end is the concept at the base of “goal interdependence.” This can be accomplished by assigning each team one product to complete and submit for grading. Having each team member complete individual components of a project that combine together to form a final team project can also foster goal interdependence.

Essential Element 2: Individual Accountability

Perhaps one of the greatest concerns expressed by teachers and parents who are unfamiliar with cooperative learning and its potential for helping children learn is that individual student’s learning will suffer. It is true that this happens in group-work assignments. Generally one person carries the group and learns a lot (and experiences high levels of stress) while the other group members ride along on his back. The idea behind “individual accountability” is that each individual in a cooperative team must demonstrate her mastery of the assigned learning and document his contribution to the team.

Another way to view individual accountability is through the idea of “equal participation.” In true cooperative learning, every individual contributes equally to team success. There are no “hitchhikers,” those that let the group carry them along for a free ride. And there are no “chauffeurs,” those that try to drive the team where they want to go. Teachers must take specific actions to ensure that there are no hitchhikers or chauffeurs on a cooperative team. Until students have been taught how to function in a collaborative fashion, hitchhiking and chauffeuring come as natural behaviors.

Tools & techniques for promoting individual accountability

Perhaps the most important technique for promoting individual accountability is to explicitly teach the social skills students need in order to function as responsible citizen on a

cooperative team (see Interaction Principle 4 below). Examples of social skills needed to promote individual accountability include: equal participation, taking turns, staying on task, responsibility, and contributing ideas.

“Roles” – Assigned groups roles are powerful in that they can promote both positive interdependence and individual accountability. But, be careful, an assigned role does not automatically promote both of these critical interaction principles. To determine how an assigned role is functioning, ask the following questions: (1) “Do the other team members need this role performed in order to be successful?” and (2) “Does this role require the person doing it to be responsible for learning in this activity.” If the answer is yes to the first question, then the role promotes positive interdependence. If the answer is yes to the second question, then the role promotes individual accountability. And if yes to both question, then it promotes both principles of interaction.

“Division of Labor” – As mentioned above in “Goal Interdependence,” some team assignments are designed so that each team member completes a discrete component of the overall assignment. By using this “component” design for cooperative projects and activities, the teacher builds in an automatic check for individual accountability.

“Coding” – It is possible to track individual contributions to team activities by coding them. A simple way of coding is to provide each team member use a different color pen, pencil, or marker. Have each team member place their name on the team’s paper or product using their color. Then everyone can tell at a glance which team members contributed which items to the team product.

“Quizzes and Tests” – Formal assessment tools are also useful in holding individuals accountable for learning. These assessments can be traditional paper-pencil instruments, cooperative assessments (see the structures listed below), or a combination of the two.

Essential Element 3: Group Processing

Group processing means having cooperative team members think about and then discuss how they are interacting and functioning as a group. This is often referred to as reflection, debriefing, or processing. The need for group processing is not uniformly emphasized across different approaches to cooperative learning. However, if we expect students to take the process of cooperating seriously and work at getting better at it, group processing becomes imperative.

In the cognitive domain, scholars do not question the need for meta-cognition – the need to think about our thinking processes. In fact, many of the well-researched strategies include a phase of the lesson where students engage in meta-cognition.

The prefix ‘meta-‘ expresses the meaning of *a higher level of development*. That is, individuals move beyond merely ‘thinking’ to develop their ability to ‘think about how they think.’ This allows persons to increase their repertoire of thinking skills by explaining their thinking processes and listening to a description of how others approached the same problem.

It is just as important in the interpersonal domain of learning that students engage in meta-interaction, or a higher level of interaction. The meta-interaction process focuses on group processes and functioning. The group moves their level of interaction beyond the simple completion of classroom tasks to work on improving their cooperative functioning and group processes. This is the key to helping students learn how to thrive as a team member.

Tools & techniques for promoting Group Processing

“Lesson Plans” – The easiest tool for implementing Group Processing is the lesson plan. From our experience, if teachers do not plan for Group Processing it is routinely forgotten when implementing cooperative learning. In the Three-phase lesson presented later in this article Group Processing fits most naturally in the assessment phase of a lesson.

“Questions” – When asking students to discuss and evaluate their team functioning, the discussion usually will not happen without certain prompts. Questions tend to be the best prompts for students new to cooperative learning. After students have consistently participated in group-processing sessions for several weeks, the teacher may simply prompt by saying, “It’s time for group processing.”

“Talking chips” – Talking chips are used to ensure all team members have a voice during group processing. Each team member is given two or three colored chips. Each team member’s chips are a different color from her teammates. When a team member speaks during group processing, she must place one chip on the table. When the chips are used, the individual must wait for all other team members to use their chips before speaking again.

“Talking sticks” – The talking stick technique is similar to “Talking Chips.” However, with the Talking Stick, only the team member holding the stick is allowed to speak. He may hold the stick for an agreed-upon length of time (usually one minute) before passing the stick to the next person on the team. A Talking Stick is usually decorated in some manner. When teams are newly formed have them create a team Talking Stick as a team-building activity. The team sticks could be decorated to represent the team’s name or the content currently being studied by the class.

“Non-linguistic organizers” – Non-linguistic organizers are effective tools for teams to use during group processing. Teams may use these organizers to represent their team’s functional strengths and the areas where they need to improve.

Essential Element 4: Social Interaction Skills are Taught Explicitly and Practiced in Class

Since humans are naturally social beings, we often assume all people know how to work together. But we are naturally egocentric and have typically been socialized to be competitive and individualistic. The tendency toward competition and individualism exists in schools as well as in the larger society. We tend to emphasize cooperation in “non-academic” areas such as with sports teams, drama productions, choirs, bands, and so on. But in “academic” classes, working with peers is often labeled “cheating.”

As a result of natural tendencies toward egocentrism and our socialization toward independent action, most students (and many adults) have not developed the skills needed to be functional members of productive groups. It then becomes the responsibility of the teacher to teach these skills explicitly as a part of the classroom curriculum. See Figure 2 for a listing of social skills identified by teachers as useful in facilitating a cooperative classroom.

Tools & techniques for social skills instruction

Social Skills are actually combinations of concepts (declarative knowledge) and procedural knowledge. As a result of the complex nature of social skills, teaching them requires a combination of methods for declarative and procedural knowledge. Any of the methods presented in *Dimensions of Learning* (Marzano, Pickering, Blackburn, Arredondo, Brandt, Moffett, Paynter, Pollock, & Whisler, 1997) for declarative or procedural knowledge will be

effective in teaching social skills. One of the most-used approaches, the T-Chart is explained in detail here. Refer to *Dimensions of Learning* (Marzano et al., 1997) for additional ideas.

“T-Charts” – Visual organizers can help students construct meaning for the concepts expressed in specific social skills. Visual tools also assist students in organizing and integrating their new knowledge with their prior knowledge. *T-Charts* help students identify specific actions and spoken communication associated with social skills. Use the steps below when constructing a T-Chart with your class.

1. Write the name of the skill to be learned and practiced at the top of a chart and draw a large T below it.
2. Label the left side of the T “*Looks Like*” and the right side of the T “*Sounds Like*.”
3. The teacher thinks of an example for each of the columns and writes that below the crossbar.
4. Ask for other behaviors that describe what people actually do while using the skill and list them under “*Looks Like*.”
5. Ask for further phrases that describe what people would actually say or verbalize while using the skill and list them under “*Sounds Like*.”
6. Have group members practice both *Looks Like* and *Sounds Like* before the lesson is concluded.

See Figure 3 for an example of a completed T-Chart.

Essential Element 5: Face2Face Interaction

The principle of Face2Face Interaction can best be understood by expanding the concept in more detail. When students are engaged in Face2Face Interaction they are ***Eye2Eye***. That means they are close enough to each other to make meaningful eye contact. The team members are also ***Knee2Knee***. That is they are close enough together to share a common set of materials and to use group voices. Group voices are speech patterns that can only be understood by group members. Persons sitting at other tables will only hear a “buzz” of conversation but no be able to follow the discussion of the other teams. Face2Face Interaction also indicates that the team is

operating on a *Level Playing Field*. All team members are on the same physical level and have the same team status.

Tools & techniques for promoting Face2Face Interaction

Face2Face Interaction is designed primarily through organization of the classroom's physical environment. Teams should be working at tables that are small enough for each team member to place a hand on a sheet of paper in the center. If tables are not available, then desk clusters are arranged to meet the same "sheet of paper" criteria. No student is seated on an elevated platform above other team members. No one student sits at the "head" of the table and "chairs" the team. Analyze your classroom structure to see if it promotes all elements of Face2Face Interaction – Eye2Eye, Knee2Knee, and a Level Playing Field.

Using cooperative structures to implement cooperative learning

Many teachers who are just starting to use cooperative learning feel overwhelmed when trying to create original classroom activities that engage their students, include meaningful content, and include all five essential elements of cooperative learning. The use of cooperative learning structures is one way of relieving the classroom teacher's stress in creating original cooperative learning lessons.

A cooperative structure is "a content-free way of organizing the interaction of individuals in a classroom" (Kagan, 1997, p. 5:1). Structures present a series of steps or actions that organize and focus classroom social interaction on assigned content knowledge. Structures are content-free since any single structure can be used with any subject area material. Kagan's presentation of the structural approach is ideal for most teachers, beginning or experienced, as it allows incremental implementation of cooperative learning. Teachers can add as few or as many

structures to their daily routine as they choose. As their ability and comfort levels increase, so does their use of cooperative learning.

In the structural approach, content is added to a cooperative structure to create a cooperative learning activity. By design, structures automatically include the two most important elements of cooperative learning, positive interdependence and individual accountability, as well as Face2Face Interaction. Group Processing and Social Interaction Skills can then be included in the lesson plan. Table 1 presents an assessment of how well each structure presented in this article addresses the essential elements of cooperative learning.

Cooperative structures have been developed by many different scholars (Johnson, Johnson, & Holubec, 1994; Kagan, 1997; Slavin, 1995). Kagan (1997) has compiled the largest single collection of cooperative structures. In this article I the presentation to eight simple structures. Many other structures exist and range from simple to quite complex. Teachers wishing to add additional cooperative structures to their personal repertoire should seek specialized training in cooperative learning and consult the resources at the end of the article.

Think-Pair-Share and Its Variations

One of the easiest cooperative structures to use is Think-Pair-Share (Lyman, cited in Kagan, 1997). Think-Pair-Share begins with the teacher posing a question and allowing individuals “think time.” Then each student pairs with one of their teammates to discuss their responses to the question. Then the teacher uses a technique such as Random Call to ask individuals to share their response or their partner’s response with the entire class.

An added advantage of this strategy is that it has several variations including Think-Pair-Square, Think-Square-Share, and Write-Pair-Share. To understand the Think-Pair-Share family of structures it is important to understand the language used to name the structures. All of these

structures begin with a question posed by the teacher, either orally or in writing. This is followed by “think time” which sometimes requires students to “Write” their response. “Pair” means that students discuss their responses with one other team member. “Square” describes a whole team discussing their responses, while “Share” refers to sharing responses with whole class. Figure 4 presents the steps in Think-Pair Share.

RoundTable and Its Variations

RoundTable (Kagan, 1997) is another useful cooperative learning structure with multiple variations. RoundTable begins with the teacher posing a question to the class. The teacher informs the teams which person (designated by role or number) will begin the team response. Then response to the question begins simultaneously in all groups. The first student in each team writes a response to the question on a sheet of paper then passes the paper to the next student. The second student writes a response and passes to the next student. This process continues around the table at least once until all persons have responded.

For some questions, you may want the answer sheet to go around the table only once. For other questions you may want to have the process go around the table several times with students giving multiple responses. Typically after the RoundTable is finished the teacher has teams to share their responses with at least one other team or the whole class. It is common to assign a follow-up activity based on the list generated during the RoundTable. Figure 5 presents the steps for RoundTable.

RoundRobin and RallyTable are the two variations of RoundTable. If you follow the procedure for RoundTable by having students give their responses orally, it is called RoundRobin. If the responses are written on a single sheet of paper passed between a pair of

students it is called RallyTable. RallyTable doubles the number of student participating at any time over RoundTable.

Corners

In Corners (Kagan, 1997) students respond to a question or prompt by choosing one of four different response options and then explaining the reasons for their choice. The teacher begins Corners by presenting a question or prompt and four possible responses to the class. Each possible response is numbered, as are the corners of the room. The teacher then provides think time for students to make decide which response they will choose. The students record their choices in writing. Next the teacher asks students to move to “their” corners and form pairs to discuss the reasons for their choice. The pairs then form groups of four and each person paraphrases their partner’s response. After paraphrasing is completed, the teacher calls on students from one corner to announce to the class reasons for their choice. Student pairs in the other corners paraphrase these reasons. These two steps are repeated for each corner. Once all corners have shared and been paraphrased, the teams return to their tables. At their tables they review to make sure everyone can explain the reasons given for selecting each corner. Figure 6 shows the steps for Corners.

Jigsaw and Expert Jigsaw

Elliot Aronson (Kagan, 1997; Slavin, 1995) first developed the Jigsaw structure. The Jigsaw concept is based on the division of labor idea. Each cooperative team member is responsible for mastering a unique portion of content and presenting that content to her teammates. Since its original development, cooperative teachers have created multiple variations

of Jigsaw. In this text we use “Jigsaw” to refer to the simplest level of jigsaw which is accomplished within a single team (Kagan, 1997).

To teach with the Jigsaw structure, the teacher first prepares the information needed by the students. This could be dividing a chapter of a text into four roughly equal portions, finding additional material, or creating original material on a topic. If you are creating handouts for students, label these #1, #2, #3, and #4. Next the teacher assigns or distributes the information to the groups. In each cooperative group, each individual is given assigned one part of the information. Each individual then begins working on his information. Each student reads his information, decides on the most important details from this information, and decides the best way to teach this information to his group. Next the students take turns teaching their information to the cooperative group. Each student has an assigned amount of time to present. Jigsaw concludes with an assessment of learning. This could be done with a traditional quiz or an alternative assessment. It is important to include group processing in the assessment of Jigsaw. Figure 7 shows the steps for Jigsaw.

Expert Jigsaw is a common variation of Jigsaw that allows students to consult with others before presenting their material to their teammates. The first two steps of Expert Jigsaw are the same as simple Jigsaw. Expert Jigsaw begins with the teacher preparing information for the student teams and distributing the information to each team. Within each team, each person is assigned one part of the information. After receiving their information, the students form expert groups. Each expert group consists of 3-4 individuals from different team who have received the same information. Students with the information labeled #1 meet together, students with #2 meet together, and so on. Since you want no more than four students in each expert group, in a large class you could end up with two (or three) expert groups for each set of information.

Within the expert groups, the students read their information, decide on the most important details, and decide the best way to teach this information to their home groups. If you have multiple expert groups on the same topic, you can also have experts consult with one another before returning to their home teams. When students return to their home groups, each student has an allotted amount of time to present her information to the home group. Expert Jigsaw closes with an appropriate method of assessing the students' learning. This could be a traditional quiz or an alternative assessment. Group Processing is an important part of assessment in Expert Jigsaw. Figure 8 shows the steps for Expert Jigsaw.

Numbered Heads Together

Numbered Heads Together (Frank, cited in Kagan, 1997) is an engaging structure that promotes mastery of declarative or procedural knowledge. It is effectively used for review before a test or quiz.

Before instruction begins, the teacher develops the questions she will use and plans for how she wants students to respond. Responses could be handled in one of the following ways:

- Black Board Response – designate a section of the chalk board for each team
 - Slate Response – give each team a small slate, chalk, or white board
 - Choral Response – each team reporter calls out the answer at the same time
 - Random Call on an Individual – the teacher randomly selects a team member to respond
- Numbered Heads Together begins by having the team members number off. On each

team, the first person becomes #1, the second becomes #2, and so on. The teacher then poses a question and informs the teams how much time is available to answer. At each table, the team members put their heads together and decide on their answer. Each team member must be able to give and explain the team's answer, because no one knows who will be called on to respond. When the time limit for answering is reached, the teacher calls time and team discussions stop.

The teacher then uses a spinner, a deck of cards, or another technique to randomly select a

number from one and four. This number determines which students are expected to respond. Those students whose numbers were selected respond using the response technique selected by the teacher during the lesson planning process. The teacher repeats these steps until all questions are answered. Some teachers give points for each correct answer and calculate quiz grades for team members. When asking questions requiring demonstration of procedural knowledge, such as completing a math problem, it is wise to add a “Write” step after the teacher poses the question and before the teammates put their heads together. This ensures that each individual is engaging in the process being assessed and reduces the opportunity for hitchhikers. See Figure 9 for the steps of Numbered Heads Together.

Mix and Match

As with Jigsaw and Numbered Heads Together, Mix and Match (Kagan, 1997) requires teachers to prepare information before teaching the lesson. For Mix and Match you prepare material similar to that used in a Matching item for an exam. For this structure you can divide the information in 2-4 parts. Examples of information to use include quotations, definitions, key phrases, or sentences. Write the information on strips of paper or 3X5 cards and place in a container. The teacher begins instruction by distributing the information. Each student selects a strip of paper from the container without looking at the information. Once all students have a piece of information, the teacher gives students the signal to mix. The students begin exchanging strips of paper with each other until the signal is given to freeze. Once students stop mixing, the teacher gives the signal to match. You need to announce to the students how pieces of information are needed to complete a match. Students find the persons with information that completes theirs and stand together ready to share. The structure closes with students reporting.

The teacher decides which reporting technique to use. Students may read their information, dramatize it, sing it, or represent it visually. See Figure 10 for the steps of Mix and Match

Continuum

The Continuum structure (Larson & Larson, 1992) is designed to help students identify personal values and share those with the class. Continuum begins with the teacher presenting a question or problem with two divergent responses. The responses are designed to be at opposite ends of the response continuum, thus the name for the structure. Next the teacher identifies an imaginary (or real) line on the classroom floor that runs from one side of the room to the other. The teacher provides think time for students to decide where on this continuum line their response would fall. After think time, students get out of their seats and move to the point on the line that represents their response. Class discussion follows. An effective way to conduct the discussion is to have students first form pairs, state their opinion, and paraphrase their partner's answer. Small group or whole class discussions can follow pair discussion. Here are three techniques for having students in the line form pairs:

- A. Turn to the person standing next to you
- B. Slide the line. Divide the line in the center and have one half of the line slide past the other half of the line until each person is facing one other person.
- C. Fold the line. Have the person at one end of the line begin walking to the opposite end. The students at that end of the line walk in a follow-the-leader manner until each person is facing one other person.
- D.

See Figure 11 for the steps of Continuum.

Either/Or

The Either/Or structure (Larson & Larson, 1992) is also designed to help students identify personal values and share those with the class. Either/Or begins with the teacher presenting a question or problem with two divergent responses. The responses are designed to

be almost opposite to each other in philosophical or practical nature. Next the teacher identifies an imaginary (or real) line on the classroom floor that divides the room into halves. One side of the room represents the first response, while the opposite side of the room represents the second possible response. The teacher provides think time for students to decide on which side of the room their response would fall. After think time, students get out of their seats and move to the side of the room that represents their response. Class discussion follows. Have students first form pairs, state their opinion, and paraphrase their partner's answer. Small group or whole class discussions can follow pair discussion. Here are two techniques for having students form pairs during Either/Or:

- A. Pair with a person on your side of the room.
- B. Pair with a person on the opposite side of the room.

See Figure 12 for the steps of Either/Or.

Organizing cooperative learning lessons

Cooperative structures can be infused in any type of lesson plan format. Perhaps the simplest way to begin with cooperative learning is what Spencer Kagan (1997) calls "Insert-A-Structure. In this approach, the teacher simply chooses an appropriate cooperative structure and "inserts" it into her already established instructional plans. Other cooperative strategies, such as Group Investigation (Sharan, 1980) STAD, TGT (Slavin, 1978, 1980), Co-op Co-op, and Color-coded Co-op Cards (Kagan, 1997), are complete lesson designs in themselves.

Many teachers find a 3-phase lesson useful when planning cooperative learning instruction. This lesson format is often referred to as a Before-During-After lesson. This text presents a three-phase lesson plan outline synthesized (Department of Teaching, Learning, & Curriculum, 2001) from various sources in the educational literature (Van de Walle, 2001; Jones,

2000; Marzano et al., 1997; Kagan 1997; Hunter, 1982). This lesson plan format can be used for all types of lessons, but is particularly useful in developing lessons based on cooperative structures. At Andrews University the Department of Teaching, Learning, and Curriculum – aka TLC – uses a lesson plan outline based on the idea that students are active constructors of knowledge. This assumption necessitates the use of a variety of instructional techniques to ensure the active engagement of learners in the lesson content. The TLC Lesson Plan Outline includes three (3) instructional phases (see Figure 13 for the TLC Lesson Plan Outline). Cooperative structures are appropriate to use in all phases of this lesson outline.

The first instructional task when beginning a lesson is to get students engaged with the lesson topic. This phase of instruction is labeled **Focus**. Teachers can shape the Focus phase of a lesson, according to her purpose. Focus could emphasize an initiating activity that instantly gets students into the lesson topic. The Focus could ask students to access prior knowledge on the topic under study.

The second phase of the lesson is labeled **Construction**. This is typically the largest portion of a lesson. During the construction phase, students are actively building their understanding of the lesson topic. This phase focuses on active student learning with individuals working to create meaning in the lesson's context.

The third lesson phase is **Assessment**; the portion of the lesson when the students and the teacher determine what has been learned. This phase can utilize a variety of approaches in addition to those typically associated with assessment activities. The Assessment phase of the lesson can include meta-cognition (analyzing thinking). For cooperative learning lessons this phase should include group processing (meta-interaction).

What to include in a cooperative learning lesson plan?

What you include in each phase of a lesson is based on your goals for that lesson. Instructional design elements which others have found useful in planning instruction include Anticipatory Set, Initiating Activity, Accessing Prior Knowledge, Teambuilding, Classbuilding, Social Skills Instruction, Acquiring Knowledge or Skills, Organizing Knowledge or Shaping Skills, Storing Knowledge or Practicing Skills, Using Complex Thinking Skills, Group Processing, Reflection, Assessment, Closure, and Feedback. These fifteen design elements fit into various places in a lesson plan outline based on the teacher's instructional goals. The third page of Figure 13 identifies where these design elements can fit into the three phases of a lesson plan outline. Any of the cooperative structures presented in this article may be used to implement any of these design elements.

Why does Cooperative Learning work?

Cooperative learning works because humans are social beings. This assumption is supported by naturalistic observation. In fact, we have developed special terms to describe persons who do not fit the “natural” mode: hermit, recluse, loner. Interacting with others, discussing ideas with others, and comparing and contrasting our ideas with those held by others all contribute to learning.

Cooperative Learning is based upon the premise that all learning is socially derived. The theory of social interdependence, developed by Morton Deutsch in the 1940s and 1950s, serves as the foundation for cooperative learning (Ellis & Fouts, 1997). Deutch's theory states that social interdependence occurs when members of a group affect the attainment of group member's goals. Deutch's work was influenced by the Kurt Lewin's field theory – the “synergy” idea that a group is more than the sum of its individual members. Lewin's work had

in turn been influenced by Gestalt theory arising from Austria in the late 1800s. The social learning theories presented by Vygotski have helped educators since Deutsch's time refine their understanding of Cooperative Learning (Ellis & Fouts, 1997).

Cooperative Learning also promotes intrinsic motivation in students as it meets their natural need for interaction, for belonging, for power and control, and it provides opportunities for students to develop and demonstrate competence (Maslow, 1968; Kagan, 1997; Slavin, 1995).

In our increasingly more complex contemporary society, problems seem to be multiplying (Kagan, 1997; Johnson, Johnson, & Holubec, 1994; and Kohn, 1999). Our health and our peaceful survival depend on educating ourselves to get along well in social groups. Being able to keep and to advance in our jobs or professions depends, to a great extent, upon our ability to work collaboratively (Secretary's Commission on . . . , 1991; Kagan, 1997; Goleman, 1995). Cooperative learning strategies and structures are designed to take advantage of our social nature and to help us learn more powerfully.

What are the typical learning outcomes for Cooperative Learning lessons?

Cooperative Learning has perhaps the largest research base of any current educational innovation, with research available at three levels: theoretical, application, and evaluation (Ellis & Fouts, 1997; Friedman & Fisher, 1998). Research documents the efficacy of Cooperative Learning to produce outcomes in three domains: cognitive, affective, and interpersonal.

In a foundational study (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981) Cooperative Learning was compared to intergroup competition, individual competition, and individual work. No difference in outcomes was found for cooperative learning when compared to cooperative groups competing against one another. However, when comparing cooperative

learning with two forms of individual work the effect size was .78. That would translate into a 28 percentile test-score gain (Marzano, 2003; Marzano, Pickering, & Pollock, 2001).

In his meta-analysis of research on cooperative learning, Slavin (1996) identified positive interdependence and individual accountability as the two factors consistently present in studies which documents significant positive learning effects. He also argues that there is research-based evidence that additional benefit may be gained by structuring group interactions during cooperative learning.

Slavin (1995) also reports that positive results for cooperative learning are consistent across all grade levels from 2-12, all curriculum areas, all school types, and all students. Cooperative learning has been shown to increase student self esteem, group relations, acceptances of at-risk students, attitudes toward school, and collaborative ability. Cooperative Learning has also been shown to promote the development of higher-level problem solving abilities.

How Can I Shape and Refine My Use of Cooperative Learning?

Getting started with cooperative learning

The simplest level of social interaction occurs between two people. Every time you add a person to the social group you increase the number of potential social interactions exponentially (see Table 2). To function effectively in this increased social complexity requires students to have more sophisticated social skills. Research indicates a decrease in learning outcomes for groups with five or more members (Marzano 2003; Marzano, Pickering, and Pollock, 2001). If you or your students are just starting to use cooperative learning, it makes sense to limit your cooperative work to pairs. As students develop their collaborative skills it will be possible to

begin using “pairs of pairs” to create temporary “squares” of four students each. After success with pairs and temporary “squares,” you may begin using regular teams of four.

Frequently Asked Questions (FAQs)

1. What social skills should I teach my students?

Teach your students the social skills they need. As the classroom teacher, you have access to the best source of information about the social skills your students need. That source is your students themselves. Your insight is the best guide in deciding which social skills to teach. If you feel insecure in your decision making abilities, ask a colleague whose judgment you respect to provide feedback on your ideas. The bottom line is this: teach students the skills they need to function successfully in collaborative teams.

2. But aren't some social skills necessary for cooperative learning to be successful?

If you are just beginning cooperative learning with students who have never functioned in cooperative teams, the following social skills are critical for success: using group voices (how to whisper), equal participation, taking turns, and add to this the unique needs of your unique class of students.

3. What is the ideal cooperative team size?

That depends on the activity. A general rule is this: “The greater the cognitive load for an activity, the smaller the cooperative teams should be.” In other words if the tasks are tough, the team should be small. Use pairs for the most challenging cognitive tasks and larger groups for easier tasks.

Resources for Developing Cooperative Learning Lessons

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Figure 1

PIGS-Face

Memory Device for the Critical Attributes of Cooperative Learning

P

Positive Interdependence

When all members of a group feel connected to each other in the accomplishment of a common goal. All individuals must succeed for the group to succeed.

I

Individual Accountability

Holding every member of the group responsible to demonstrate accomplishment of the learning.

G

Group Processing

When group members assess their collaborative efforts and target improvements.

S

Social Skills

Human interaction skills that enable groups to function effectively. Such skills enhance communication, trust, leadership, decision-making, and conflict resolution.



Face-to-face Interaction

When group members are close in proximity to each other and dialogue with each other in ways that promote continued progress.

From Green, Burton, & Henriquez-Green,
2001

Figure 2

Social Interaction Skills

Basic Cooperative Skills

- being self-controlled (keeping hands and feet to yourself)
- moving quietly into groups
- occupying the same space cooperatively
- sitting in the group
- staying with the group
- using group (quiet) voices

Individual Attitudes & Skills

- accepting differences
- acknowledging worth of others
- being a good sport
- being gentle
- controlling anger
- following directions
- following through
- ignoring distractions
- perseverance
- responsibility
- restraining impulsive behavior

Team Interaction Skills

- active listening
- asking for clarification
- asking for justification
- asking questions
- being assertive in acceptable ways
- criticizing ideas, not people
- describing feelings when appropriate
- disagreeing in agreeable ways
- disagreeing without criticizing people
- encouraging teammates
- expressing nonverbal encouragement/support
- extending another's answer
- including everyone
- maintaining eye contact
- negotiating
- positive comments (no "put-downs")

- praising
- probing, asking in-depth questions
- resolving conflicts
- responding appropriately to others
- saying kind things
- saying please/thank-you
- taking a position when the situation warrants it
- using teammates' names

Team Productivity Skills

- brainstorming
- being accurate
- celebrating success
- checking for understanding
- clarifying ideas
- collaborative planning
- contributing ideas
- dividing responsibilities equitably
- elaborating
- energizing the group
- equal participation
- integrating multiple ideas into single positions
- managing materials
- pacing group work
- paraphrasing
- reaching agreement/consensus
- set and maintain standards for team work
- setting team goals
- sharing materials
- staying on task
- summarizing
- taking turns
- using timelines to manage projects

Adapted from B. Bennett, C. Rolheiser-Bennett, L. Stevah (what source??) and Marzano et al. (1997)

“Disagreeing in an Agreeable Way”

Looks Like...	Sounds Like...
Eye contact with subtle shake of the head	“I understand what you are saying... we might also want to consider....”
Smiling while you make your statement	“I see your point, however...”
Group members listening fully to one another’s ideas before commenting	“Your point is important, but I wonder if another idea might be...”
Slight shoulder shrug and head shake	“I don’t agree because...” “That’s an interesting idea, nonetheless...” “You may want to consider...”

Figure 3
Example of Completed T-Chart

Figure 4

Think- Pair - Share

Step-by-Step

Step 1 **Teacher poses a question**

Step 2 **Individuals *think* about their answer**

Step 3 **Students form *pairs***

Step 4 **Students *share* with the whole class**

There are many techniques that promote whole class sharing. You decide which to use:

Random Call – Have students' names on 3x5 cards and randomly draw names and call on the students.

Volunteers – Be careful or the same old students will respond every time.

Simultaneous Share – Have each pair of students write their responses on a large sheet of paper (or an assigned portion of the chalk board) in large letters. Then one student from each pair posts the sheet on the wall so everyone can see it.

3 Stay - 1 Stray – One representative from each cooperative team travels to the next cooperative group as an official reporter.

Figure 5

RoundTable

Step-by-Step

Step 1 **Teacher poses a question**

Step 2 **First student responds**

The first student in each group writes a response to the question and passes the paper to the next student

Step 3 **Second student responds**

The second student writes a response and passes to the next student

Step 4 **Other students respond in turn**

This process continues around the table at least once

Notes:

If the responses are written on a single sheet of paper passed between pairs it is called **RallyTable**.

If you follow the same procedure by having students give responses orally it is called **Roundrobin**

Figure 6

Corners

Step-by-Step

- Step 1 Present the question and possible answers
- Step 2 Think time
- Step 3 Students move to corners
- Step 4 Students pair in corners
- Step 5 Pairs combine and paraphrase
- Step 6 Corners report
- Step 7 Corners paraphrase (repeat Step 6 & 7 for all corners)
- Step 8 Teams review

Figure 7

Jigsaw

Step-by-Step

- Step 1 The teacher prepares the information**
- Step 2 Distribute the information**
- Step 3 Individual students work**
- Step 4 Students Teach**
- Step 5 Assessment**

Figure 8

Expert Jigsaw

Step-by-Step

- Step 1 Prepare the information**
- Step 2 Distribute the information**
- Step 3 Form expert groups**
- Step 4 Expert groups work**
- Step 5 Experts Teach**
- Step 6 Assessment**

Figure 9

Numbered Heads Together

Step-by-Step

- Step 1** **Teacher plans for type of responses**
- Step 2** **Team members number off**
- Step 3** **Teacher poses a question**
- Step 4** **Teams put heads together and decide on their answer**
- Step 5** **Teacher calls time**
- Step 6** **Teacher randomly selects a number**
- Step 7** **Those students whose numbers were selected respond**
- Step 8** **Repeat**
Repeat steps 3 - 7 until all questions are answered.

Figure 10

Mix and Match

Step-by-Step

- Step 1 Prepare the information**
- Step 2 Distribute the information**
- Step 3 Give students the signal to mix**
- Step 4 Give students the signal to freeze**
- Step 5 Give students the signal to match**
- Step 6 Students match**
- Step 7 Students report**

Figure 11

Cont i nuum

St ep-by-St ep

- 1. Teacher presents a question or problem**
- 2. The teacher identifies the continuum**
- 3. Students think**
- 4. Students move to represent their response**
- 5. Form Pairs**
- 6. Pairs discuss**
- 7. Class discussion**

Figure 12

Eit her/ Or

St ep-by- St ep

- 1. Teacher presents a question or problem**
- 2. The teacher identifies the two sides of the argument**
- 3. Students think**
- 4. Students move to represent their response**
- 5. Form Pairs**
- 6. Pairs discuss**
- 7. Class discussion**

Figure 13
TLC Lesson Plan Outline

TLC Lesson Plan Outline

Lesson Descriptors

Subject area(s): _____ Date lesson developed _____

Lesson topic: _____ Grade level band _____

Objectives:

Standard(s) and benchmark(s):

Materials needed:

Instructional Phases

Phase 1: Focus — (students get on-task)

Phase 2: Construction — (students build meaning)

Phase 3: Assessment — (students & teacher reflect on learning)

Figure 13, continued
TLC Lesson Plan Outline

Potential elements for inclusion in each phase of the TLC Lesson:

Focus Phase:

- Anticipatory Set
- Initiating Activity
- Accessing Prior Knowledge
- Teambuilding
- Classbuilding
- Social Skills Instruction

Construction Phase:

- Acquiring Knowledge or Skills
- Organizing Knowledge or Shaping Skills
- Storing Knowledge or Practicing Skills
- Using Complex Thinking Skills
- Social Skills Instruction
- Classbuilding
- Teambuilding

Assessment Phase:

- Group Processing
- Reflection
- Assessment
- Closure
- Feedback

Table 1
Assessment of Cooperative Structures by Essential Elements

Cooperative Structure	Positive Interdependence	Individual Accountability	Group Processing	Social Skills	Face2Face Interaction
Think-Pair-Share	Intermediate	Intermediate	*	*	High
Write-Pair-Share	Intermediate	High	*	*	High
RoundRobin	Intermediate	Intermediate	*	*	High
RoundTable	Intermediate	High	*	*	High
Jigsaw	High	High	High	*	High
Expert Jigsaw	High	High	High	*	High
Mix-n-Match	High	Intermediate	*	*	High
Corners	High	High	*	Active Listening Paraphrasing	High
Numbered Heads Together	High	High	*	*	High
Continuum	Moderate	High	*	Active Listening Paraphrasing	High
Either/Or	Moderate	High	*	Active Listening Paraphrasing	High

*Not inherent in the structure. Must be included in the lesson plan.

Table 2
Number of Possible Interpersonal Interactions
in Cooperative Groups of Varying Sizes

# in Group	Number of Possible 2-way interactions	Number of Possible 3-way interactions	Number of Possible 4-way interactions	Number of Possible 5-way interactions	Number of Possible 6-way interactions	Total # of possible interactions
2	1	0	0	0	0	1
3	3	1	0	0	0	4
4	6	4	1	0	0	11
5	10	10	5	1	0	26
6	15	20	15	6	1	57