



Cooperative Learning: Students Working in Small Groups

Researchers report that, regardless of the subject matter, students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats.

Barbara Gross Davis, *Tools for Teaching*

Without denying the significance of traditional lectures and instructor-led discussions in undergraduate education, an increasing number of teachers are recognizing the value of also assigning collaborative work to their students. Small group work, used both in and out of class, can be an important supplement to lectures, helping students master concepts and apply them to situations calling for complex applications of critical thinking skills. In a recent talk in the Award-Winning Teachers on Teaching Series entitled “Let Them Do It Themselves—In Groups,” Professor of Biological Sciences and President Emeritus Donald Kennedy addressed this issue, reminding his audience that Stanford students “do a great deal for one another” in promoting learning, and that it’s important that instructors “tap into this by practicing a kind of catalyzed learning by creating opportunities whereby [collaboration] can crystallize and take shape.”

While many instructors occasionally break their classes into small informal groups to accomplish brief tasks, the kind of collaborative group work discussed here refers to projects that last an entire class period, several class sessions, or even an entire quarter. Groups may be assigned by the instructor or decided upon by the students themselves (and there are advantages and disadvantages to each approach) but the key is that the tasks to be accomplished require interdependence—so that no individual student can complete the assignment alone. Sometimes called Problem-Based Learning, when it extends over a period of time, this form of instruction requires the teacher to plan projects in advance but then step aside in order to facilitate—not dominate—the actual learning process.

Collaborative group work requires careful planning on the part of the instructor, and is not without its difficulties for students. But the benefits can be substantial, including increased participation by students in all components of the course, better understanding and

retention of material, mastery of skills essential to success in the course or in a career, and increased enthusiasm for self-directed learning—the kind of enthusiasm that can spur students on to independent research or honors projects.

Outlined here are some suggestions for using collaborative tasks to accomplish course goals, including advice on how to avoid potential problems.

Assigning Group Tasks that Promote Learning

The decision to include cooperative learning assignments in a course should be based on a careful examination of course goals. For example, if students are expected to be able to apply theoretical knowledge to real-world problems, or demonstrate decision-making or problem-solving skills similar to those made by professionals in the field, then it may be appropriate to include group work in the design of the course. It’s best not to think of group work as something added on to an existing course structure, but instead something that helps shape the design of the syllabus and helps synthesize specific course objectives. Other important factors to consider before including group assignments are class size—since larger classes will require more attention to organization—and the means that will be used to evaluate group work (so that sufficient

*Check Out A New Source of Insights
about Teaching!*

Current issues of the
National Teaching & Learning Forum
are now available on CTL’s Website at
<http://www-ctl.stanford.edu>
under “Resources for Faculty”

time and instructional support are available to provide feedback on group projects).

The kinds of group tasks planned for the course also need to be examined to ensure that they are likely to result in effective group efforts. Group cohesiveness can be encouraged and some of the difficulties groups face (which are examined below) can be eliminated or minimized if assignments are designed to:

- (1) require a high level of individual accountability for group members;
- (2) require members to discuss issues and interact;
- (3) ensure that members receive immediate, unambiguous, and meaningful feedback; and
- (4) provide explicit rewards for high levels of group performance (Michaelson, Fink, and Knight 1997).

Individual accountability is essential to group success, since the natural tendencies of some students to dominate and some to withdraw will gradually come into play unless some mechanism is in place requiring everyone to participate. This may be as simple as a worksheet that each member uses to note down their contribution—to the group discussion in class that day or to work on a larger project during the week. Or it may involve having students critique each other's contributions, especially if part of the end product is a written document to which everyone contributes.

If, indeed, a final written report documents the group's work, it is very possible that little discussion or interaction actually occurred as the assignment moved to completion; in this case, though the instructor asks for a group effort, students are able to divide work up, delegating tasks to individuals, one of whom eventually gathers together the various individual parts. Interaction and discussion are much more likely if students are required to solve a problem or make a decision based on research and analysis of a complex situation. With such problem-based tasks which immerse students in information-rich discussions, "they are also likely to learn two important lessons about their group: (1) Other members' input is a valuable resource and (2) *we* can accomplish something by working together that none of us could have accomplished on our own" (Michaelson, Fink, and Knight, 1997).

Feedback from the instructor, from group members, and from other groups helps each group keep on track and therefore helps build cohesiveness. If groups are unclear about their progress, then difficulties between members may hinder their ability to work in an orderly fashion toward an agreed upon goal. And finally, the final work should be graded as a group project, so that peer pressure from within the group motivates individuals to work together—even though organizational or personal difficulties may arise along the way.

Another way of considering what makes an effective group activity is to consider the characteristic features of a good problem:

- They tell engaging stories in settings to which the students can relate, thus solidifying the eventual connection between theory and application.
- They are open-ended, challenging students to make and justify estimations and assumptions.
- They engender controversy or require decisions, so

A Preparatory Checklist for Collaborative Tasks

Have I determined or clarified. . .

- where the group experience fits into the overall curriculum?
- what the overall purpose is and what the learning goals are?
- whether the learning goals are sufficiently specific, clear, worthy, realistic, and achievable?
- the group activities and the schedule—are the activities meaningful and is there sufficient time to accomplish the goals?
- the planned group's size and mix of characteristics?
- who the learners are—their interests, strengths, and learning needs?
- what resources are needed for the session?
- the kind of leadership I need to provide?
- the learners' roles and responsibilities?
- how decisions will be made in the group?
- how the learners will be evaluated?

Adapted from *Fostering Learning in Small Groups: A Practical Guide* by Jane Westberg & Hilliard Jason.

their solutions require students to demonstrate thinking skills beyond simple knowledge and comprehension.

- They are complex enough for students in each group to recognize the need to work together to succeed in arriving at a satisfactory conclusion (Allen, Duch, and Groh, 1996).

And finally, group assignments should include a detailed plan for proceeding with the work including, if possible, examples of stages along the way that help groups monitor their success. Instructor feedback, in meetings or from progress reports, should be included in the time-line for the project.

Teaching Students to Work in Groups

In a competitive academic environment, where students have most often been rewarded for individual effort, collaboration may not come naturally or easily for everyone. And even though most students have worked together informally in study groups or social organizations, they

may never have thought carefully about the kinds of skills that best promote group achievement. Faculty who make collaborative assignments and fail to provide specific guidelines or models for successful work may find students struggling to get group projects off the ground.

Of course, some students (like some instructors) initially express skepticism about the value of group work, or feel that class time is best spent hearing from the instructor (who's the authority) rather than working with students who, they believe, know as little as themselves. Others may feel that they have succeeded thus far on individual effort, and don't want to be encumbered by other students with different histories of success or different working methods. And some students are simply shy and unaccustomed to sharing their work with their peers. Being clear, at the outset of the class and in the syllabus, about how much of the work in the course will involve group effort, and about why such group work will help achieve the goals of the course, will go a long way toward overcoming the objections of some students (and will at least warn students with serious reservations that they may want to choose another course). Addressing the importance of group work and the goals of group work is essential, since students will be far more motivated to participate if they see the relevance of the group assignments to larger course objectives.

Instructors well practiced in leading classes through complex intellectual inquiries often do not fully appreciate the fact that their sophisticated teaching skills have been honed over years of interaction—and that most students have little training in guiding their peers through such activities. The interpersonal and organizational skills needed for managing a group project need to be highlighted in any assignment, so that students recognize the importance of such things as: listening, clarifying statements, and providing good feedback; keeping discussions on task; probing assumptions and evidence; eliciting viewpoints and perspectives; mediating conflicts; and summarizing and presenting findings (Bosworth, 1994). If specific skills are called for in an assignment, the instructor should identify them and provide examples of the successful use of such skills in the assignment or in classroom sessions. One simple way of providing such help is to suggest roles group members might adopt in their work—for example, facilitator (to lead discussions), notetaker (to record and summarize progress), planner (to outline where and how the group is proceeding through the assignment), evaluator (to elicit critiques)—and provide descriptions and examples of these roles.

Unless group management skills are identified, and unless students are asked to reflect on their successes and difficulties with exercising these skills, few participants will see the relationship between completing the project and achieving some of the larger goals of the assignment or course. The time taken to examine these skills can be crucial to the success of these projects; as one group of faculty using group work in an introductory biology course point out, “Although most teachers are understandably reluctant to spend valuable class time discussing group process, we suggest that the student disengagement that results from major problems in group dynamics

makes the investment of one class period in group work skills well worthwhile” (Miller, Trimbur, and Wilkes, 1994).

Forming and Guiding Groups

Most faculty who have included collaborative work in their courses agree that groups of between 4 and 6 students seem to work best, though depending on the task, larger groups (8-10 students) can function successfully. Determining how the groups will be formed can be more complicated, since ideally the groups should be diverse enough to include students with a range of intellectual abilities, academic interests, and cognitive styles. Allowing students to select their own group members can work well in small classes, but this method always runs the risk of further isolating some students or creating cliques within the class as a whole. With larger classes, random selection, selection based on compatibility of schedules (students who can meet for group sessions at a certain hour each week), or selection determined by the instructor based on questionnaires completed on the first day of class can work well and all will seem fair to the students.

Once groups have been determined and their assignments have been explained, it's not wise to wait until the final product or solution appears before providing feedback. Not only do students sometimes need help interpreting assignments, often they need advice and encouragement at the outset, to reassure themselves that the path they are choosing leads in the right direction. By including early check-ins, and especially by asking for the group's overall plan of action, instructors can not only offer useful suggestions but also redirect efforts potentially headed for disaster. Besides asking for an initial plan, instructors can have students report on their progress through a checklist of steps in the project or ask for brief journal entries each week.

In offering feedback during group projects, however, it's important to allow students to make their own decisions about how to proceed. The instructor's role is to guide but not dictate what should happen amongst the group members. If, for example, group members complain that someone isn't doing his or her fair share, make it clear that solving this issue is up to the group and won't be solved by the intervention of the instructor.

Evaluating Group Work

Since as stated earlier, individual accountability is essential in ensuring successful group work, instructors need to determine how best to grade, taking both individual and group effort into consideration. Of course in most classes, a grade for any group project will usually be supplemented in the student's final grade with midterm and final examinations. But individual accomplishment in the group work itself can be assessed, so that members feel that even their contribution to the group has been evaluated adequately. During the group project, students can still be given in-class quizzes asking for specific information on what they have learned so far, what they feel they have contributed to the project, and how they would

improve the group's efforts. Or individuals can be called upon at random to make brief reports on the group's progress, including a description of problems overcome and questions still to be addressed.

Grading the group achievement overall should be based both on the success of the final product and the group's assessment of its operations. Many group efforts result in a paper or presentation or the solution to a specific problem. If class size allows, the entire class can offer feedback on such products by having them shared—papers can be photocopied and made available on reserve or can be posted on a website; presentations can be made to the entire class or can be videotaped and circulated. To help students fairly evaluate other groups' work, the instructor can distribute evaluation guidelines that ask students to score projects (for example, on a scale of 1 to 5) in such areas as degree to which they address and clarify major issues, raise and answer relevant theoretical or practical concerns, explore relevant research, and address objections or contrary findings. More extensive individual critiques, especially of written work, can be part of the project as it develops, and can also be incorporated into students' final individual grade.

Groups themselves can evaluate the effectiveness of their own work toward the final product, and assess each member's contributions. Again, an evaluation form can be provided that asks group members to rate their peers in areas such as their professionalism (attendance at meetings, participating appropriately), their initiative (suggesting ideas, working constructively toward common goals), and their independence (completion of tasks at agreed-upon deadlines, researching topics and sharing resources) (See Cramer, 1994, p. 76 for a sample evaluation).

By explaining these grading procedures early in the course, before the group work begins, students will probably express less discomfort with the idea of a group grade, and will feel peer pressure to contribute and work toward the common goal. Most students, indeed, are concerned that they not appear foolish or irresponsible to their classmates.

Experimenting to Learn

Many faculty members who recognize the benefits of collaborative work still hesitate to use it, fearing that coverage of material will be sacrificed. Restructuring a course to include group work may indeed mean spending more time on fewer topics, but "research shows that students who work in groups develop an increased ability to solve problems and evidence greater understanding of the material" (Davis, 1993). Perhaps beginning with modest collaborative assignments and supplementing classwork with additional readings will resolve some of the conflicts between coverage and depth. Students, with the proper help, can be guided toward greater autonomy and take on a greater responsibility for their own education if instructors provide them with useful, engaging, and relevant tasks to accomplish with their peers.

Bibliography on Cooperative Learning

- Allen, D., Duch, B., and Groh, S. "The Power of Problem-Based Learning in Teaching Introductory Science Courses." In L. Wilkerson and W. Gijsselaers (Eds.), *Bringing Problem-Based Learning to Higher Education: Theory and Practice*. San Francisco: Jossey-Bass, 1996.
- Bosworth, K. "Developing Collaborative Skills in College Students." In K. Bosworth and S. Hamilton (Eds.), *Collaborative Learning: Underlying Processes and Effective Techniques*. San Francisco: Jossey-Bass, 1994.
- Bruffee, K. *Collaborative Learning: Higher Education, Interdependence, and the Authority of Knowledge*. Baltimore: Johns Hopkins, 1993.
- Cohen, E. *Designing Groupwork: Strategies for the Heterogeneous Classroom*. 2nd Ed. New York: Teachers College, 1994.
- Cramer, S. "Assessing Effectiveness in the Collaborative Classroom." In K. Bosworth and S. Hamilton (Eds.), *Collaborative Learning: Underlying Processes and Effective Techniques*. San Francisco: Jossey-Bass, 1994.
- Davis, B. *Tools for Teaching*. San Francisco: Jossey-Bass, 1993.
- Kennedy, D. "Let Them Do It Themselves—In Groups." Center for Teaching and Learning videotape. 1999.
- Michaelsen, L., Fink, D., and Knight, A. "Designing Effective Group Activities: Lessons for Classroom Teaching and Faculty Development." In D. DeZure (Ed.) *To Improve the Academy*. Stillwater, OK: POD Network, 1997.
- Miller, J., Trimbur, J., and Wilkes, J. "Group Dynamics: Understanding Group Success and Failure in Collaborative Learning." In K. Bosworth and S. Hamilton (Eds.), *Collaborative Learning: Underlying Processes and Effective Techniques*. San Francisco: Jossey-Bass, 1994.
- Smith, K. "Cooperative Learning: Making 'Groupwork' Work." In T. Sutherland and C. Bonwell, *Using Active Learning in College Classes: A Range of Options for Faculty*. San Francisco: Jossey-Bass, 1996.
- Tiberius, R. *Small Group Teaching: A Trouble-Shooting Guide*. Ontario: OISE, 1990.
- Westberg, J. and Jason, H. *Fostering Learning in Small Groups: A Practical Guide*. New York: Springer, 1996.

