Commonly Asked Questions about Teaching Collaborative Activities

The following is an excerpt from Diane M. Enerson, R. Neill Johnson, Susannah Milner, and Kathryn M. Plank, *The Penn State Teacher II: Learning to Teach, Teaching to Learn* (University Park, PA: The Pennsylvania State University, 1997). The book is now an online publication and can be found at http://www.schreyerinstitute.psu.edu/Resources/.

How do I decide which assignments/activities to make collaborative? — A good rule of thumb is that if there's no reason for an activity to be collaborative, perhaps it shouldn't be. As you contemplate making a project collaborative, consider these questions: What is the objective or goal of this assignment or activity? How will that objective be furthered by asking students to work in groups? Is this project complex and challenging enough that it would be impossible for an individual student to complete it alone? Will this project require students to synthesize their work in true collaboration, rather than just complete work separately and turn it in together at the end? Collaborative activities, large or small, work best when they draw on the strengths of group interaction — for example, a rough draft workshop in a writing class allows each writer to receive comments from several different readers. In a more long-term collaborative project, such as an engineering senior design project, one of the objectives may be to teach students to draw on the skills and abilities of each member of a team. Engineering students, like students from nearly every discipline, need effective collaboration skills upon graduation if they are to enter the workplace successfully.

How do I divide students into groups? — Once you have decided to use a collaborative activity, one of the first issues you'll face is the composition of the groups. How many students should be in each group? Should you let them choose their teammates, or should you arrange the groups? Should you divide them by ability level? By demographics? To get heterogeneous groups or homogenous groups? Obviously, the answer to all of these questions depends in part on your objectives for the assignment. Group size can range anywhere from two, for an informal problem-solving session in the middle of the class period, to eight, for a semester-long team assignment. In the latter case, the group is large enough that there will probably be subgroups within the group. Karl A. Smith suggests starting out with small groups so that students become accustomed to the different roles necessary for effective groups before moving to larger groups.[1] Of course, group size is largely determined by the amount of work the project requires — if the assignment only provides enough work for three people, a group of five will be bored, ineffective, and probably dissatisfied.

Whether or not you let students self-select their groups also depends on your purpose and the type of assignment. For short, informal in-class activities, asking students to turn to a neighbor or a friend may be the quickest and simplest way to divide the class. Even for more formal assignments, some instructors find that letting students form their own groups according to established criteria is a successful practice. Most teachers agree, however, that when you plan an extensive collaborative activity, such as a major class project, it is better for you to arrange the groups. Students who choose to work with friends often have a harder time with group projects than students in groups chosen by the teacher. Arranging the groups yourself allows you to draw

on your knowledge of the abilities, interests, and needs of individuals to create increased opportunities for learning.

You can use a variety of criteria for selecting the groups. If you're teaching an upper-division course in the major, for example, where all students share the same background knowledge, you may simply want to make a random selection, or group students with similar areas of interest together. On the other hand, if the goal of the project is for groups to integrate a variety of skills, you may want to sort students so that each group has a mix of background experience, abilities, work styles, and approaches to learning. It is probably best not to group students strictly by ability level, as some diversity generally fosters increased learning among the entire group. In addition, grouping by past performance is difficult because successful collaboration requires different skills from successful individual projects; you may find that students who earn high marks on individual assignments are not the most effective group members in your class.

How can I help students learn to work in groups? — As mentioned above, your students don't necessarily know how to work in groups. After years of working independently and competitively, they may find cooperation and collaboration difficult concepts to accept in an academic setting. They are so accustomed to individual grades that it may not be obvious to them how to work together when their grade depends, in part, on the performance of other students in the class. This lack of preparation may undermine the effectiveness of your collaborative assignment and keep students from meeting the objectives of the project. For example, if each of the four students working together on a newsletter treat the project like an individual assignment rather than synthesizing their efforts, the final product will be disjointed rather than seamless. Moreover, the students in such a group are unlikely to learn how to make effective use of the experience. To prepare them to work together as a team, you might start the group project with team-building activities such as Bob Melton's spaghetti tower, followed by a debriefing or a discussion of the group dynamics that surface during the exercise. These activities help students to recognize each other's strengths and work styles, and make them more aware of the internal resources their group might draw on for a more serious project. Any in-class group activity that requires all the members of the group to work together to achieve a common goal can be used as a starting point for a discussion of group dynamics.

In helping their students learn to work as members of a team, some teachers identify separate roles within effective groups (note-taker, agenda-setter, and so on) and ask each group to divide the roles between the members. Others administer a personality instrument like the Myers-Briggs Type Inventory, followed by a session on how each personality type translates to work styles and relationships.[2] Karl A. Smith emphasizes the balance between positive interdependence — the idea that no student can succeed without the success of the rest of the group — and individual accountability within groups.[3] He encourages teachers to explain these concepts and make expectations and objectives clear from the start of the project. Kris Bosworth writes that most students have the interpersonal skills that are necessary for effective group work, but that they consider these skills social rather than academic. She suggests that teachers identify these social skills and use modeling and other methods to help students bring their interpersonal experience explicitly into the classroom to promote collaborative learning.[4] Whatever method they use to bring students together in teams, experienced teachers agree that effective collaborative activities depend on students taking individual responsibility for their work and that of the other members

of their group, and using communication and teamwork skills to maintain a productive group relationship.

How can I deal with conflicts within the groups? — The first step is to realize that some conflict is perhaps inevitable — and maybe even desirable. Part of what students are learning in a group project is how to negotiate differences and deal with other people to reach a common goal.

Groups sometimes become stronger as they work through the conflicts that arise with the clash of different ideas and work habits. As Miller, Trimbur, and Wilkes point out, "excessive conflict can certainly interfere with performance. Paradoxically, excessive harmony can do the same, because members of the best groups tend to be critical of one another's work or at least to tolerate an in-house critic; they tend also to impose high standards on themselves." [5] Of course, this kind of creative tension doesn't worry most teachers as much as the potential personality conflicts that sometimes cause bitter feelings and unproductive groups.

One of the best ways to deal with such conflicts is to prevent them from happening in the first place. As we have mentioned, some conflict arises out of the fact that students don't necessarily know *how* to work in groups. After years of developing individual skills in competition, students need to learn how to trust other group members, how to delegate, how to negotiate, and many other team skills. Helping students understand group dynamics can also prevent conflicts. Miller, Trimbur, and Wilkes identify personality characteristics and learning styles as two areas that shape the dynamics of the group, and encourage teachers to accommodate these differences by providing groups with ways of dealing with conflict as it arises. They argue that, although educating students about group process takes class time that might be spent on course content, spending a class period discussing group work skills can make a major difference in the success of the project. "We should teach the skills that we are grading. Thus, such a session should include a briefing on the necessity for and logistics of good communication and organization and give participants an opportunity to discuss the various kinds of talents and individual differences or preferences that different people bring to tasks." [6] They suggest activities such as small groups solving a simple puzzle and reflecting on the group process afterward, students roleplaying, group interaction and discussing scenarios as a class, or reading and discussing information about the characteristics of different work styles and personality types, and how to accommodate these differences.

No matter how well you prepare, however, variables outside your control ensure that conflicts will sometimes occur. Keeping in touch with the progress of the groups — through periodic progress reports or team assessments, for example — allows you to identify problems within the groups as they arise. If a group is having trouble resolving a problem, you will want to decide how active a role you are willing to take to help your students handle the situation. One strategy is to invite students to your office both individually and as a group to discuss the problem and possible approaches to a solution. During these meetings, you may find that students who are unhappy have not talked to the other members of their group about their dissatisfaction. By acting as a temporary discussion facilitator among the members of the group, you help students develop skills for dealing with confrontation and encourage them to talk with each other about the problems they are having.

Sometimes, students request a change to the group membership. Most teachers experienced in collaborative approaches believe that groups should be changed only in the most extreme cases, when every other avenue for resolution has failed. When students realize that they will not be permitted to change groups easily, they feel more committed to negotiating problems within their groups. Make it clear that you expect groups to work through their differences, and they will be more likely to do so. Making changes to the groups sets the group process back to the beginning, and discards the benefits that have come from early interaction — even if some of that interaction has been confrontational.

How do I grade collaborative work? — Assessment of a collaborative activity is probably the biggest challenge teachers face when using this method. Collaborative activities often have several goals — individual learning on the part of each student, the successful functioning of a team, and a collaborative product that may be measured against diverse criteria. In other words, one reason why it is difficult to evaluate collaboration is that you must examine the *process* as well as the *product* of the group's work. Usually, long-term collaborative activities finish with a product created by all of the members of the team. In such a group project, how is individual work to be evaluated? Alternatively, the group process may end with each student turning in an individual assignment to be graded. In such cases, how can a teacher assess the success of the group? No matter what kind of project the students create, evaluation works best when it takes into account both product and process.

The most obvious thing to evaluate when grading a collaborative project is the final product. In some activities, students work as a group while projects are graded individually. For example, a group of students in a landscape architecture class might work as a group to create a design for a garden in a public space on campus. Such a project would require the team to research the public's needs, the existing vegetation, and the feasibility for changes within a certain budget and time frame. The final product would include a design for the garden and a document addressing the issues researched by the students. One way to grade this project on an individual basis would be for the group to divide the work into identifiable sections and for each member to be responsible for one section. For instance, one student would research the possibilities and limitations of the space, another would write the report, and yet another would draw the design. Instead of grading the project as a unified whole, the teacher would evaluate each section and assign individual grades to each student. This type of project can have some drawbacks, as the final product may be disjointed and uneven, and the teacher may find it difficult to evaluate each individual part for a separate grade — particularly if some students were responsible only for research rather than for writing or drawing. Another way to assign individual grades to a final product would be for the students to work as a group in the researching and planning stages, with each student then turning in his or her own design for the garden. The group would function as a common resource as the students worked on their designs, but each student would be graded on an individual "final product."

However, most long-term collaborative projects finish with each group turning in one document, design, or model that represents the collective work of the entire group — and is graded as such. In the example above, group members would work together at each level of the assignment, researching and writing together, and the final design and document would represent the work of

a team rather than a group of individual workers. The teacher would then grade the design and the document as a single product, assigning the same grade for the final product to each member of the team — although individual grades might change when each student's contribution to the group process is taken into account. This type of project tends to capture the ideal of collaboration more effectively than individually graded projects, because each member of the team feels responsible for every part of the assignment. Whether the group's product is evaluated on an individual or a collective basis, however, a collaborative project is much more than the final document. Usually, one basic objective for such a project is that students learn to work as team members. How can you measure whether each student has achieved this objective? As anyone who has ever worked on a group project realizes, a successful final product does not necessarily mean that the group functioned as a team and that each member contributed equally to the work. In response to this characteristic of groups, teachers who employ collaborative activities have created several methods of evaluating group process and determining whether each student demonstrated personal accountability for the project. As is true with all other teaching methods, the best results will generally be obtained by using multiple assessments throughout the project, rather than focusing only on a single evaluation at the end.

One way of assessing the effectiveness of the groups is to monitor and observe the members' interactions as they work together. Observation gives you an understanding of the quality of each group's interaction and their progress on the assignment. This kind of observation can take place in the classroom, if groups are working together in class, or through group progress reports and updates turned in during the project. When observing in class, you can look for signs of productive group work — attentive listening, serious discussion, and progress toward a shared goal with input from each member of the group. Another informal way some teachers observe their students in collaboration is by having the teams use e-mail to communicate progress, plans and decisions as they conduct their project, and by asking students to send copies of these procedural messages to the teacher's e-mail address. This allows the teacher to observe unobtrusively the interaction of the group. Finally, some teachers use periodical progress reports to monitor their groups. When they read the reports, they check that the group is following a work plan and making progress together toward a specific goal. Progress reports are useful because they encourage students to reflect on the effectiveness of their group throughout the project, and to articulate plans for completing the assignment. For example, many teachers ask their students to complete weekly progress reports describing the tasks that each group member has completed, outlining the tasks to be completed in the next week, and confidentially commenting on each group member's contributions. Two or three required progress reports turned in during a long term group project can help you assess how well groups are achieving the objectives of the assignment.

Although observation can provide some insight on group effectiveness and individual performance, it works best when used in conjunction with detailed feedback from the group members themselves. Since the members of the teams are best equipped to assess their teammates' and their own contributions to the project, many teachers now include their students' voices in the final evaluation process. For example, both David Meredith (Engineering) and Larry Spence (Political Science) have reported good results from using a simple point system for evaluating individual contributions to the group. Meredith tells us that he asks each student to

"allocate a fixed number of points (say twenty) among the rest of the team members. The values are averaged for each student, and form a weighting factor for the final team project score."

Many teachers elaborate on this idea by asking students to complete peer assessment forms when the project is complete. These forms generally include a point system similar to the one described above, and spaces for confidential comments about the contribution of each group member. Usually, the student is asked to include a self-assessment on the form, so that the teacher may understand how the student perceives his or her own contribution to the group in relation to that of other members. Robert Melton (Aerospace Engineering) requires students to complete a form that asks about the dependability, accuracy, and value of each team member's contribution to the project. In addition, the students assign a numerical rank and qualitative assessment to the contributions of each group member — including themselves. Likewise, Kathryn Dansky (Health Policy and Administration) asks students to assign numerical scores to each team member (including themselves) in five major areas: leadership, cooperation, communication, work ethic, and quality of work.

Finally, these student assessments of group process and individual contribution can be combined with your evaluation of the team's product to determine each student's final project grade. In your calculations you will weight the two scores according to the objectives of the assignment, but in general, peer assessment tends to determine from 5% to 30% of the project grade. In cases where successful group process is as important an objective as is the product, the two scores might be weighted equally. Whichever method you choose, inform the students of the grading policy at the start of the project, so that your expectations for the assignment are clear. Grading collaborative activities is always challenging, but with peer assessment, individual performance can be rewarded while each student's grade still depends largely on the success of the entire group.

In what ways can technology support the goals of collaborative learning? — Just as technology can serve the lecture and discussion methods of teaching, it can also be used as a tool to address some of the challenges presented by collaborative activities. Many of the uses of technology for group projects work well in any discipline, and are simple to plan and implement. For example, assigning periodic group progress reports to be submitted by e-mail is an easy way to keep up with each group's project, and your e-mail response can be sent to each team member. E-mail also simplifies out-of-class communication within the groups, since students often use it to exchange ideas and set up meetings. This idea is taken a step farther in the English department, where students writing collaboratively provide feedback on each other's writing using Common Space, a communication and feedback software. Because the students' comments appear in separate columns set up for each writer, this software facilitates collaborative writing by bringing together feedback from each group member onto one draft, without losing track of the source of each response. In addition, the software converts documents from different word processing programs and operating systems, allowing drafts and feedback to be sent quickly and easily to group members as e-mail attachments. The use of e-mail progress reports and collaborative writing software also prepares graduates for their entry to the workplace, where such tools are increasingly being used to support collaboration and communication.

Other teachers have used technology by creating World Wide Web sites that serve as resources for students working on collaborative projects. One excellent example of this idea is the Engineering Design and Graphics 100 Web site,[7] created and maintained by Dhushy Sathianathan (Engineering Design and Graphics). This award-winning site combines resources for the course's collaborative design assignments, space for the student Web sites which are a requirement of each group project, and links to the Web sites of all the teachers of ED&G 100. As resources for design projects, Sathianathan has included an outline of the engineering design process, guidelines for the reports students will complete, and several project management and assessment tools. These tools, along with the class itself, help students identify and develop the skills needed to form an effective team. The site supports students as they learn to plan and run a productive meeting, use action plans and progress reports, and perform self-assessment to track the progress of the team. Such management tools help to address many of the challenges of collaboration, such as learning to work in groups and communicating in ways that defuse potential group conflicts. Sathianathan's site also includes assessment and evaluation forms that students use to evaluate the contributions made by their teammates and themselves. Past and present student projects make the site as dynamic as it is helpful.

The ED&G 100 site clearly shows the critical role of students in the collaborative classroom. Indeed, with or without the tools of technology, the true strength of collaborative methods is that they allow students to work together to build their individual skills. When students learn through discussion and exploration, they establish ownership of the material.

NOTES:
[1]Karl A. Smith, "Cooperative Learning: Making 'Groupwork' Work," in *Using Active Learning in College Classes: A Range of Options for Faculty,* New Directions for Teaching and Learning, no. 67, ed. Tracey Sutherland and Charles C. Bonwell (San Francisco: Jossey-Bass, Fall 1996), 71-82.

[2]Judith Miller, John Trimbur, and John M. Wilkes discuss ways to use the Myers-Briggs Type Inventory to plan collaborative activities in "Group Dynamics: Understanding Group Success and Failure in Collaborative Learning," *Collaborative Learning: Underlying Processes and Effective Techniques*, New Directions for Teaching and Learning, no. 59, ed. Kris Bosworth and Sharon J. Hamilton (San Francisco: Jossey-Bass, Fall 1994), 33-44.

[3]Karl Smith's discussion of ways to encourage the group process appears in "Cooperative Learning: Making 'Groupwork' Work."

[4]Kris Bosworth, "Developing Collaborative Skills in College Students," *Collaborative Learning: Underlying Processes and Effective Techniques*, New Directions for Teaching and Learning, no. 59, ed. Kris Bosworth and Sharon J. Hamilton (San Francisco: Jossey-Bass, Fall 1994), 25-31.

[5]Miller, Trimbur, and Wilkes, 35.

[6]Miller, Trimbur, and Wilkes, 42.

[7]The Engineering Design and Graphics site referred to here is no longer active. Current information on the Penn State School of Engineering Design, Technology and Professional Programs can be found at http://sedtapp.psu.edu/.