

Collaborative Learning: Group Work and Study Teams

Students learn best when they are actively involved in the process. 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. Students who work in collaborative groups also appear more satisfied with their classes. (Sources: Beckman, 1990; Chickering and Gamson, 1991; Collier, 1980; Cooper and Associates, 1990; Goodsell, Maher, Tinto, and Associates, 1992; Johnson and Johnson, 1989; Johnson, Johnson, and Smith, 1991; Kohn, 1986; McKeachie, Pintrich, Lin, and Smith, 1986; Slavin, 1980, 1983; Whitman, 1988)

Various names have been given to this form of teaching, and there are some distinctions among these: cooperative learning, collaborative learning, collective learning, learning communities, peer teaching, peer learning, reciprocal learning, team learning, study circles, study groups, and work groups. But all in all, there are three general types of group work: informal learning groups, formal learning groups, and study teams (adapted from Johnson, Johnson, and Smith, 1991).

Informal learning groups are ad hoc temporary clusterings of students within a single class session. Informal learning groups can be initiated, for example, by asking students to turn to a neighbor and spend two minutes discussing a question you have posed. You can also form groups of three to five to solve a problem or pose a question. You can organize informal groups at any time in a class of any size to check on students' understanding of the material, to give students an opportunity to apply what they are learning, or to provide a change of pace.

Formal learning groups are teams established to complete a specific task, such as perform a lab experiment, write a report, carry out a project, or prepare a position paper. These groups may complete their work in a single class session or over several weeks. Typically, students work together until the task is finished, and their project is graded.

Study teams are long-term groups (usually existing over the course of a semester) with stable membership whose primary responsibility is to provide members with support, encouragement, and assistance in completing course requirements and assignments. Study teams also inform their members about lectures and assignments when someone has missed a session. The larger the class and the more complex the subject matter, the more valuable study teams can be.

The suggestions below are designed to help you set up formal learning groups and study teams. If you have never done group work in your classes, you might want to experiment first with informal learning groups. Two other tools, "Leading a Discussion" and "Supplements and Alternatives to Lecturing: Encouraging Student Participation," describe a variety of easy ways to incorporate informal learning groups into your courses. "Helping Students Write Better in All Courses" discusses informal collaborative writing activities.

General Strategies

Plan for each stage of group work. When you are writing your syllabus for the course, decide which topics, themes, or projects might lend themselves to formal group work. Think about how you will organize students into groups, help groups negotiate among themselves, provide feedback to the groups, and evaluate the products of group work.

Carefully explain to your class how the groups will operate and how students will be graded. As you would when making any assignment, explain the objectives of the group task and define any relevant concepts. In addition to a well-defined task, every group needs a way of getting started, a way of knowing when its task is done, and some guidance about the participation of members. Also explain how students will be graded. Keep in mind that group work is more successful when students are graded

against a set standard than when they are graded against each other (on a curve). See "Grading Practices." (Source: Smith, 1986)

Give students the skills they need to succeed in groups. Many students have never worked in collaborative learning groups and may need practice in such skills as active and tolerant listening, helping one another in mastering content, giving and receiving constructive criticism, and managing disagreements. Discuss these skills with your students and model and reinforce them during class. Some faculty use various exercises that help students gain skills in working in groups (Fiechtner and Davis, 1992). See "Leading a Discussion" for examples of guidelines for participating in small groups. (Sources: Cooper, 1990; Johnson, Johnson, and Smith, 1991)

Consider written contracts. Some faculty give students written contracts that list members' obligations to their group and deadlines for tasks (Connery, 1988).

Designing Group Work

Create group tasks that require interdependence. The students in a group must perceive that they "sink or swim" together, that each member is responsible to and dependent on all the others, and that one cannot succeed unless all in the group succeed. Knowing that peers are relying on you is a powerful motivator for group work (Kohn, 1986). Strategies for promoting interdependence include specifying common rewards for the group, encouraging students to divide up the labor, and formulating tasks that compel students to reach a consensus. (Source: Johnson, Johnson, and Smith, 1991)

Make the group work relevant. Students must perceive the group tasks as integral to the course objectives, not just busywork. Some faculty believe that groups succeed best with tasks involving judgment. As reported by Johnson, Johnson, and Smith (1991), for example, in an engineering class, a faculty member gives groups a problem to solve: Determine whether the city should purchase twenty-five or fifty buses. Each group prepares a report, and a representative from each group is randomly selected to present the group's solution. The approaches used by the various groups are compared and discussed by the entire class. Goodsell, Maher, Tinto, and Associates (1992, pp. 75-79) have compiled a detailed bibliography of discipline-specific efforts in collaborative learning that can be useful for developing tasks and activities.

Create assignments that fit the students' skills and abilities. Early in the term, assign relatively easy tasks. As students become more knowledgeable, increase the difficulty level. For example, a faculty member teaching research methods begins by having students simply recognize various research designs and sampling procedures. Later, team members generate their own research designs. At the end of the term, each team prepares a proposal for a research project and submits it to another team for evaluation. (Source: Cooper and Associates, 1990)

Assign group tasks that allow for a fair division of labor. Try to structure the tasks so that each group member can make an equal contribution. For example, one faculty member asks groups to write a report on alternative energy sources. Each member of the group is responsible for research on one source, and then all the members work together to incorporate the individual contributions into the final report. Another faculty member asks groups to prepare a "medieval newspaper." Students research aspects of life in the Middle Ages, and each student contributes one major article for the newspaper, which includes news stories, feature stories, and editorials. Students conduct their research independently and use group meetings to share information, edit articles, proofread, and design the pages. (Sources: Smith, 1986; Tiberius, 1990)

Set up "competitions" among groups. A faculty member in engineering turns laboratory exercises into competitions. Students, working in groups, design and build a small-scale model of a structure such as a bridge or column. They predict how their model will behave when loaded, and then each model is loaded to failure. Prizes are awarded to the groups in various categories: best predictions of behavior, most efficient structure, best aesthetics. (Source: Sansalone, 1989)

Consider offering group test taking. On a group test, either an in-class or take-home exam, each student receives the score of the group. Faculty who have used group exams report that groups consistently achieve higher scores than individuals and that students enjoy collaborative test taking (Hendrickson, 1990; Toppins, 1989). Faculty who use this technique recommend the following steps for in-class exams:

Assign group work at the beginning of the term so that students develop skills for working in groups.

Use multiple-choice tests that include higher-level questions. To allow time for discussion, present about twenty-five items for a fifty-minute in-class exam.

Divide students into groups of five.

Have students take the test individually and turn in their responses before they meet with their group. Then ask the groups to arrange themselves in the room and arrive at a group consensus answer for each question. Score the individual and group responses and prepare a chart showing the average individual score of each group's members, the highest individual score in each group, and the group's consensus score. Ninety-five percent of the time, the group consensus scores will be higher than the average individual scores (Toppins, 1989).

Organizing Learning Groups

Decide how the groups will be formed. Some faculty prefer randomly assigning students to groups to maximize their heterogeneity: a mix of males and females, verbal and quiet students, the cynical and the optimistic (Fiechtner and Davis, 1992; Smith, 1986). Some faculty let students choose with whom they want to work, although this runs the risk that groups will socialize too much and that students will self-segregate (Cooper, 1990). Self-selected groups seem to work best in small classes, for classes of majors who already know one another, or in small residential colleges (Walvoord, 1986). Still other instructors prefer to form the groups themselves, taking into account students' prior achievement, levels of preparation, work habits, ethnicity, and gender (Connery, 1988). They argue for making sure that members of each group are exclusively graded students or exclusively pass/ not pass students and that well-prepared students be placed in groups with other well-prepared students. Other faculty, however, try to sprinkle the more able students evenly among the groups (Walvoord, 1986). A middle ground, proposed by Walvoord (1986), is to ask students to express a preference, if they wish, then make the assignments yourself. You could, for example, ask students to write down the names of three students with whom they would most like to work.

Be conscious of group size. In general, groups of four or five members work best. Larger groups decrease each member's opportunity to participate actively. The less skillful the group members, the smaller the groups should be. The shorter amount of time available, the smaller the groups should be. (Sources: Cooper, 1990; Johnson, Johnson, and Smith, 1991; Smith, 1986)

Keep groups together. When a group is not working well, avoid breaking it up, even if the group requests it. The addition of the floundering group's members to ongoing groups may throw off their group process, and the bailed-out troubled group does not learn to cope with its unproductive interactions. (Source: Walvoord, 1986)

Help groups plan how to proceed. Ask each group to devise a plan of action: who will be doing what and when. Review the groups' written plans or meet with each group to discuss its plan.

Regularly check in with the groups. If the task spans several weeks, you will want to establish checkpoints with the groups. Ask groups to turn in outlines or drafts or to meet with you.

Provide mechanisms for groups to deal with uncooperative members.

Walvoord (1986) recommends telling the class that after the group task is completed, each student will submit to the instructor an anonymous assessment of the participation of the other group members: who did extra work and who shirked work. If several people indicate that an individual did less than a fair

share, that person could receive a lower grade than the rest of the group. This system works, says Walvoord, if groups have a chance in the middle of the project to discuss whether any members are not doing their share. Members who are perceived as shirkers then have an opportunity to make amends. Here are some other options for dealing with shirkers:

Keep the groups at three students: it is hard to be a shirker in a small group.

Make it clear that each group must find its own way to handle unproductive group behavior.

Allow the groups, by majority vote, to dismiss a member who is not carrying a fair share. Students who are dropped from a group must persuade the group to reconsider, find acceptance in another group, or take a failing grade for the project.

Perhaps the best way to assure comparable effort among all group members is to design activities in which there is a clear division of labor and each student must contribute if the group is to reach its goal. (Sources: Connery, 1988; Walvoord, 1986)

Evaluating Group Work

Ensure that individual student performance is assessed and that the groups know how their members are doing. Groups need to know who needs more assistance in completing the assignment, and members need to know they cannot let others do all the work while they sit back. Ways to ensure that students are held accountable include giving spot quizzes to be completed individually and calling on individual students to present their group's progress. (Source: Johnson, Johnson, and Smith, 1991)

Give students an opportunity to evaluate the effectiveness of their group. Once or twice during the group work task, ask group members to discuss two questions: What action has each member taken that was helpful for the group? What action could each member take to make the group even better? At the end of the project, ask students to complete a brief evaluation form on the effectiveness of the group and its members. The form could include items about the group's overall accomplishments, the student's own role, and suggestions for changes in future group work. Rau and Heyl (1990) have developed a form that can be used for an interim or final evaluation. (Sources: Johnson, Johnson, and Smith, 1991; Walvoord, 1986)

Decide how to grade members of the group. Some faculty assign all students in the group the same grade on the group task. Grading students individually, they argue, inevitably leads to competition within the group and thus subverts the benefits of group work. Other faculty grade the contribution of each student on the basis of individual test scores or the group's evaluation of each member's work. If you assign the same grade to the entire group, the grade should not account for more than a small part of a student's grade in the class (perhaps a few bonus points that would raise a test score from a B - to a B). (Sources: Cooper, 1990; Johnson, Johnson, and Smith, 1991)

Offer Alternate Testing Formats:

Information retention and organization, information application, and creation of new information can all be evaluated individually or within the groups. A few alternatives to traditional testing include:

Paired testing: Paired students complete essays or traditional tests (multiple choice, true/false, open-ended, matching, etc.). With the help of packages like Office2000, each member of the pair can use editing tools to identify their own work and justify answers. Grades can be assigned to individual as well as to pair answers with justifications. Scores can focus on the content of the paper as well as the pair's ability to work together. When using a editing tools, efforts of individuals are documented within the final paper.

Group testing: This approach combines individual work, discussion, analysis, and justification techniques. The test sequence can begin with individuals completing items at home or in class then progress to a discussion of the questions with the goals of providing evidence to support or reject options.

The process can also begin within the group as team members negotiate answers and provide justifications. A simple voting process to reach consensus as to the correct answer will not suffice: all selections must be justified. For an in-depth analysis of multiple choice items, faculty can require students to explain why an option is incorrect. This step is particularly useful for providing further validation of items. Scores are assigned to the group and all members receive the same score on the exam.

Faculty must provide students with guidelines for tracking student participation in the justification process or for dealing with students who do not participate in order to avoid the "free rider syndrome" that can cause students to resent this type of testing format.

Dealing with Student and Faculty Concerns About Group Work

"I paid my tuition to learn from a professor, not to have to work with my classmates, who don't know as much." Let students know at the beginning of the term that you will be using some group techniques. Students who are strongly antagonistic can drop your class and select another. Inform students about the research studies on the effectiveness of collaborative learning and describe the role it will play in your course. Invite students to try it before deciding whether to drop the class. (Source: Cooper and Associates, 1990)

"Our group just isn't working out." Encourage students to stick with it. Changing group membership should really be a last resort. Help your students learn how to be effective group members by summarizing for them some of the information in "Leading a Discussion" and "Encouraging Student Participation in Discussion."

"Students won't want to work in groups." Some students may object, in part because most of their education has been based on individual effort, and they may feel uncomfortable helping others or seeking help. The best advice is to explain your rationale, design well-structured meaningful tasks, give students clear directions, set expectations for how team members are to contribute and interact, and invite students to try it. (Source: Cooper and Associates, 1990)

"Students won't work well in groups." Most students can work well in groups if you set strong expectations at the beginning of the term, informally check in with groups to see how things are going, offer assistance as needed, and provide time for groups to assess their own effectiveness. Some groups may indeed have problems, but usually these can be resolved. See "Encouraging Student Participation in Discussion" for suggestions on how to minimize monopolizers, draw out quiet students, and generally engage all students in active participation.

"If I do group work, I won't be able to cover as much material during the semester as I do when I lecture." Yes, adding group work may mean covering 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. Some instructors assign additional homework or readings or distribute lecture notes to compensate for less material "covered" in class. (Source: Cooper and Associates, 1990)

Setting Up Study Teams

Tell Students about the benefits of study teams. Study teams meet regularly outside of class to study together, read and review course material, complete course assignments, comment on each other's written work, prepare for tests and exams, and help each other with difficulties that are encountered in class. Study teams are guided by the notions that students can often do as a group what they cannot do by themselves and that students can benefit from peer teaching-explanations, comments, and instruction from their coursemates.

Explain how study teams work. Study teams can work in a number of ways. In one model, all students read the assignments but each member agrees to provide to the group in-depth coverage of a particular

segment of the material and to answer as fully as possible whatever questions other members of the study team might raise. In this model, then, each member agrees to study all the material yet each also tries to become an "expert" in a certain area of the material.

In another model, the teams' activities vary from meeting to meeting. For example, at one meeting, teams might review class notes to see whether there is agreement on the most important points of the lecture or discussion. In another session, teams might go over a class quiz or test to ensure that all team members clearly understand each of the questions, especially those that were answered incorrectly by one or more members. Another session might be devoted to reviewing problem sets or exchanging drafts of written papers for peer editing.

In a third model, the main agenda for each study team session is a set of study questions. Early in the term, the study questions are provided by the professor or graduate student instructors. After three or four weeks, each team member must bring a study question related to the week's lecture material to the team meeting. The questions structure the discussion and are modified, discarded, or replaced by the group as the session proceeds. At the session's end, the study questions that the group chooses as the most valuable are turned in for review by the instructor. You can let students decide for themselves how to structure their study teams, or you can offer advice and suggestions. (Sources: Gushy, 1988; Johnson, Johnson, and Smith, 1991; Light, 1992; "Study Groups Pay Off," 1991)

If Study teams are optional, offer students extra credit for participation. For example, students who are members of an official study team might get bonus points for each assignment, based on the average grade received by the individual group members. (Source: "Study Groups Pay Off," 1991)

Let students know what their responsibilities are as a study team member. Students who participate in study teams agree to do the following:

- Prepare before the study team meeting (for example, do all the required reading or problem sets)
- Complete any tasks that the group assigns to its members
- Attend all meetings and arrive on time
- Actively participate during the sessions in ways that further the work of the group Help promote one another's learning and success
- Provide assistance, support, and encouragement to group members
- Be involved in periodic self-assessments to determine whether the study team is working successfully (Is too much work being required? Is the time in study team meetings well spent?)

In addition, let students know that they can improve the effectiveness of their study teams by making sure each session has a clearly articulated agenda and purpose. They can also work more efficiently if all logistical arrangements are set for the semester: meeting time, length, location.

Help students locate meeting rooms. Arrange with your department or campus room scheduler to make available small meeting rooms for study teams. If appropriate, consider using group rooms in the residence halls.

Limit groups to no more than six students. Groups larger than six have several drawbacks: it is too easy for students to become passive observers rather than active participants; students may not get the opportunity to speak frequently since there are so many people; students' sense of community and responsibility may be less intense in larger groups.

Let students select their own study teams unless you have a large class. Since the groups are designed to last the term and will meet outside of class, give students the opportunity to form groups of three to six members. Arrange one or two open groups for students who do not know others in the class. If students will be selecting their own groups, offer several small group activities during the first three weeks of class and rotate the membership of these ad hoc groups so that students can get to know one another's interests and capabilities before forming study teams. See "Personalizing the Large Lecture,"

"Supplements and Alternatives to Lecturing," "Encouraging Student Participation in Discussion," and "The First Day of Class" for ideas on small group activities and how to help students get to know one another.

If your class is very large and letting students select their own groups seems too difficult, have students sign up for teams scheduled to meet at particular times. This means that students will form groups based solely on when they can regularly attend a study team meeting. Try to form the groups by sections rather than for the large lecture class overall. Students in the same section are more likely to know each other and feel a sense of responsibility for their study team. (Source: Walvoord, 1986)

Use a portion of class time for arranging study groups. Announce that study groups will be set up during the third or fourth week of the course. At that time, hand out a description of study teams and students' responsibilities, and let students talk among themselves to form groups or to sign up for scheduled time slots. Suggest that all members of the study team exchange phone numbers. Encourage the study teams to select one person as the convener who will let all members know where the group is to meet.

Devote a class session to study teams. Ask students to meet in their study teams to review course material or prepare for an upcoming exam or assignment. Use the time to check in with the groups to see how well they are operating. Some faculty regularly substitute study team meetings for lectures. To the extent possible, meet with a study team during an office hour or review the work of a study team sometime during the semester.

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