Opening Day: Getting Started in a Cooperative Classroom

By Frank J. Dinan

"Star for star, the players from places like Lithuania or Puerto Rico don't rank well versus Americans, but when they play as a team, when they collaborate better than we do, they are extremely competitive."

Comments on why the USA is no longer dominant in Olympic basketball, from Thomas L. Friedman's *The World Is Flat*

Since 1993, I have been teaching organic chemistry in a team-oriented, cooperative learning manner (Dinan and Frydrychowski 1995; Dinan 2002). Over the years I have come to realize that the time and effort spent during the first days of a new semester are key to the success of the class that lies ahead. What happens during these first days can set a tone that inspires students to work actively and cooperatively to achieve success in the new semester, or to sit back and assume a "here we go again" attitude. With this in mind, I begin each new year with activities designed to convince my students that they are valued as individuals, activities that will help them to get to know each other and to begin to appreciate the diversity, character, and knowledge of their fellow students. Most importantly though, I set out to demonstrate the great power that working together in cooperative teams has to enhance their learning.

I begin the first class by introducing myself. In this introduction, in addition to a brief review of my academic background, I tell students about some of my interests (baseball, films, and cycling), explain how I came to fall in love with organic chemistry, and share how I came to the conclusion that organic chemistry could be taught effectively using the cooperative learning techniques. All of this is intended to help students to think of me more as someone who wants to help them learn, and less as an obstacle to be overcome to complete the course.

We then move on to an interactive review of the course syllabus. I begin by distributing a copy of the syllabus to each student. The syllabus is more complex than most because, in addition to the usual administrative content, it describes how the essential elements of the cooperative learning technique that we will be using—problem-based team learning (PBTL)—will interact to form the backbone of the course that lies ahead. Additionally, the syllabus describes how case studies, peer evaluations, and individual and team grading will be used in the determination of their final grades.

After allowing students adequate time to complete their individual readings of the syllabus, I pointedly *do not* ask if there any questions. Instead, I ask each student to pair with a neighbor, exchange names, and discuss the questions and ambiguities that arose for each of them during their individual readings of the syllabus. After allowing some time for this discussion, I ask each of the student pairs to get together with another pair of students, exchange introductions, and discuss their observations and questions. I then ask each group of four to decide on a spokesperson who will present any points the groups may wish to have clarified, or any observations they may wish to make about the syllabus.

After responding to the group's questions and comments, I tell students that we are about to start learning each other's names. We do this by forming 8–10-person circles. A student begins by giving his or her first name, and the student next to that student repeats the first student's name and gives his or her own first name. The third student repeats the previous two names and gives his or her own name. This pattern continues until everyone has been involved. I actively participate in this process. After we have gone around the circle, I give a tennis ball to one student in each circle, and tell that student to throw the ball to anyone else in the circle. The person to whom the ball is thrown must give the name of the thrower and

Frank J. Dinan (dinan@canisius.edu) *is a professor in the Department of Chemistry and Biochemistry at Canisius College in Buffalo, New York.*

may then throw the ball to another person. If the receiver can't identify the thrower, then the thrower repeats his or her name and play resumes. Again, the pattern continues until everyone in the circle has been named.

By now, most of the allotted time for the first class has passed. I inform students that at the next class I will announce the composition of the cooperative-learning teams that will be together for the remainder of the semester. Before our next class meeting, I obtain the grades each of the students in my class achieved in related classes taken in the past. Using this information, as well as my personal observations from the first class, I determine the composition of the four-person learning teams. I put these teams together to maximize their diversity in terms of academic ability, gender, race, personality, and so on.

At the beginning of the second class, I announce the composition of the learning teams and ask the team members to gather, place their chairs in a tight circle, and exchange the information they will need to stay in touch with each other during the semester ahead. While this is underway, I take a digital photograph of each learning team. A student assistant prints these photos within minutes. I then give each team its photo and ask students to write their full name under the picture and write the name they wish to be called in class in parentheses under their full name. Studying these photos allows me to know each student's name by the time the third class begins. This, I find, is a big help in establishing the informal classroom atmosphere that I prefer and that most students seem to value. I post the learning team photos and names on the webpage for each class so they are available to all of the students.

With students still gathered together in their teams, I continue to help them to get to know each other by asking them to each share the funniest experience that they can recall involving food. This exercise is designed to get students talking and sharing light, personal information. I ask each team to select one of their stories and share it with the whole class. This exercise is not only a great icebreaker, it also leads to the telling of some very funny tales that help to bring the class closer together.

The remainder of the second class is taken up playing the NASA Game. This is an exercise designed by NASA in the 1960s to convince the early astronauts of the power of cooperative decision-making. These astronauts were all test pilots, accustomed to making critical life-or-death decisions on their own in the cockpits of the planes they were testing. The power of cooperative decision-making had to be convincingly demonstrated to them because they would now be acting as members of cooperative teams in the spacecraft they would jointly occupy. The game was designed to demonstrate to the early astronauts that they had greater problem-solving power when they acted cooperatively than when they tried to solve complex problems as individuals. In the classroom, the NASA game vividly demonstrates to students how much the members of their learning teams can help each other by sharing their knowledge cooperatively.

To start the game, each student is given a description of a situation in which a space crew finds itself: Their ship has crash-landed on the dark side of the Moon, about 320 meters from the mother ship that they must reach. Students are each given a list of the items that were left undamaged in the crash, and, working individually, they must rank the items in terms of their importance and ability to help in making the journey to the mother ship. After this task is complete, each student team is then given one new copy of the same list of items and told to work cooperatively to reach a consensus decision on the ranking of the same items. When the teams have arrived at their new consensus ranking, they are given the ranking of the items that was determined by NASA experts. They then calculate the difference between their individual scores and the experts' ranking, and their team's score and the NASA rankings. Almost always, the team rankings are much closer to the NASA rankings than are those made by any of the individual students that comprise the teams. I record all of this information on the board so that everyone can see how well the teams have done relative to their individual members. Students are impressed by how well the teams do working cooperatively relative to any individual team member working alone. This exercise provides students with a clear demonstration of the power their teams have to solve complex problems when they work cooperatively.

Occasionally, one student's individual ranking of the items is closer to the NASA rankings than the team's consensus score. This situation offers an excellent opportunity to ask the teams to analyze how this could happen in a cooperative decision-making setting. The answer, of course, lies in a failure to communicate effectively. Either the knowledgeable student did not communicate his or her knowledge well, or the members of that team did not pay attention to his or her contribution. Either way, the team is made aware of a problem that it has and can begin to deal with

it. The other teams, too, benefit from listening to and observing this discussion. Students find the outcome of this exercise very impressive and refer to it often during the months ahead. (For further details about this game, visit *http://corrections.com/nic/pdf_mirror/05112005_SpaceSurvivalExercise.pdf*.)

The NASA game ends the second day of the new semester. We are now ready to settle down to our task for the semester ahead: learning organic chemistry. The question is, have these two days helped to prepare the nascent class to do this? Would the two class days be better spent immediately delving into the meat of the course? Obviously, I don't think so.

Success in a cooperative learning approach depends on—even demands—good communication skills, trust, and a feeling that we are all in this together, that we can help each other to learn and to become better learners. The exercises described above are designed to begin to develop these attitudes. My experience indicates that they pay off richly by starting students moving along the path to good interpersonal relationships, making them feel comfortable in their new learning environment, and convincingly illustrating the power of cooperative decision-making. The cost that is paid for these desirable, highly valuable outcomes is a small one: two class periods. The outcome, as the credit card commercial says, and as many new semesters have demonstrated, is "priceless."

References

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