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CHAPTER 2

Getting Started with Team-Based Learning

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This chapter has been written for teachers who are ready to consider using team-based learning in their courses but who want a clearer picture of why this approach has such great potential and what it takes to make it work effectively. After explaining what it is that gives learning teams their unusual and special capability for promoting significant learning, I will identify the four key principles that govern the effective use of learning teams (part 1) and then describe what happens from start to finish in a team-based learning course (part 2). At the end of the chapter, I also have a few comments about why I believe team-based learning is such an attractive option for teachers in a variety of teaching situations.

The purpose of this chapter is to provide readers with a broad understanding of the characteristics of team-based learning along with the capability to implement it as an instructional strategy. It must be emphasized, however, that the tremendous power of team-based learning is derived from a single factor: the high level of cohesiveness that can be developed within student learning groups. In other words, the effectiveness of team-based learning as an instructional strategy is based on the fact that it *nurtures the development of high levels of group cohesiveness* that, in turn, results in a wide variety of other positive outcomes. When one fully understands the importance of group cohesiveness as the foundation for building learning teams, the relative significance of the procedures and activities described herein become readily apparent.

Based on evidence from both personal experience and empirical research (see Chapter 4), it clearly takes a transformation process to evolve a small group into a powerful, cohesive learning team. The paragraphs that follow will outline a set of

principles and practices that are critical to this transformation process. The first part of this chapter presents four key principles for implementing team-based learning, and outlines why they must be followed. The next part provides a discussion of the steps involved in actually implementing team-based learning, and the first part of the chapter describes the benefits of team-based learning, especially its adaptability across a variety of teaching and learning situations.

THE FOUR ESSENTIAL PRINCIPLES OF TEAM-BASED LEARNING

Teachers who shift from traditional forms of teaching to a team-based learning approach, will find that this shift leads to significant changes in: (1) the focus of their instructional objectives, (2) the nature of the “events” through which learning occurs, and (3) the role of both instructor and student.

Traditionally, the primary learning objective of most classes is to familiarize students with course concepts. By contrast, the primary learning objective in team-based learning is to ensure that students have the opportunity to practice *using course concepts*. As a result, the vast majority of class time is used for teamwork on application-focused team assignments. This in turn requires that the instructor’s primary role shift from one who is dispensing information to one who designs and manages the overall instructional process. Furthermore, instead of being a passive recipient of information, students are required to accept responsibility for the initial exposure to the course content so that they will be prepared for the in-class team work.

Changes of this magnitude do not just happen automatically. They are, however, the reliable and natural outcome when the four essential principles of team-based learning have been implemented. The essential principles are:

1. groups must be properly formed and managed;
2. students must be made accountable for their individual and group work;
3. group assignments must promote both learning and team development;
4. students must have frequent and timely performance feedback.

When these principles are in place, mere groups of students evolve into cohesive learning teams. A description of each of these principles is provided in the following paragraphs.

Principle 1: Groups Must Be Properly Formed and Managed

Forming effective groups involves managing two important variables. One is that the groups must be formed in a way that avoids establishing groups whose membership characteristics are likely to interfere with the development of group cohesiveness. The other is ensuring that the groups have approximately the same talent pool to

draw from in completing their assignments. Otherwise, the teacher will encounter a great deal of difficulty in designing assignments that are manageable but challenging enough to promote learning. In addition, the groups should be large and diverse enough to ensure that they have adequate resources to complete their assigned tasks and should remain intact for the duration of the course. (See Chapter 4 for a review of empirical literature related to these issues).

Minimizing Barriers to Group Cohesiveness

Probably the greatest inhibitors to the development of group cohesiveness are either a previously established relationship between a subset of members in the group (e.g., boyfriend/girlfriend, fraternity brothers, etc.), or the potential for a cohesive subgroup based on background factors such as nationality, culture or native language. In newly formed groups, these factors are likely to become the basis for a cohesive subgroup from which other members are likely to feel excluded for the entirety of a course. As a result, allowing students to form their own groups practically ensures the existence of potentially disruptive subgroups (Fiechtner & Davis, 1985; Michaelsen & Black, 1994). Thus, teachers should use a group formation process that mixes students up in a way that forces the groups to build themselves into teams “from the ground up.”

Distributing Member Resources

For groups to function as effectively as possible, they should also be as diverse as possible. That is, every group should have access to those students in the class who have the potential for making a significant contribution to the success of their group. Diversity issues focus on factors such as student assets and liabilities as well as student characteristics such as gender, ethnicity, and so on. For groups to be more evenly matched, relevant student assets, liabilities, and characteristics should be distributed equitably across the groups. Member assets may include full-time work experience, previous relevant course work, access to perspectives from other cultures, or other characteristics. Member liabilities may be in the form of negative attitudes toward the course, limited fluency in English, no previous relevant course work, and so forth. When relevant member assets, liabilities, and characteristics are evenly distributed, learning teams will work more effectively. However, it takes input from the teacher to determine which student characteristics may serve as either assets or liabilities for this particular class. In other words, students do not intuitively have enough information or the inclination to wisely form groups; therefore the task must always be the responsibility of the teacher. (See the section entitled “Forming the Groups” on p. 40.)

Learning Teams Should Be Fairly Large and Diverse

Because team-based learning assignments involve highly challenging intellectual tasks, teams must be fairly large and diverse. That is, teams should be comprised of five to seven members and as heterogeneous as possible. If teams are smaller and/or

homogeneous, some are likely to face the problem of not having a sufficiently rich talent pool of individual resources needed to be successful.

Groups Should Be Permanent

Students should stay in the same group for the entirety of the semester. Although even a single well-designed group assignment usually produces a variety of positive outcomes, it is only when students work together over time that they become cohesive enough to evolve into self-managed and truly effective learning teams. Team development occurs through a series of interactions that enable individual members to test the extent to which they can trust their peers to take them seriously and treat them fairly. In newly formed groups, members typically begin the testing process by engaging in small talk and by carefully avoiding disagreements, even though doing so (i.e., avoiding disagreements) inevitably limits their ability to work productively. As a result, newly formed groups tend to rely heavily on their most competent member and have a limited ability to tap the resources of the rest of the group. If properly nurtured, most groups will, in time, develop more productive interaction patterns. Realistically, however, even under favorable conditions, most groups require working together in excess of 20–25 hours before they can fully assess and benefit from the resources of all members of the group (Watson, Michaelsen & Sharp, 1991). In addition, membership diversity initially inhibits both group processes and performance, but becomes a clear asset when members have worked together over an extended period of time (Watson, Kumar, & Michaelsen, 1993).

As groups develop into teams, communication becomes more open and, as long as members have information relevant to the issues at hand, is far more conducive to learning. In part, this occurs because trust and understanding build to the point that members are willing and able to engage in intense give-and-take interactions without having to worry about being offensive or misunderstood. In addition (and in contrast to temporary groups), team members are willing to risk challenging each other because they see their own success as being integrally tied to the success of their team. Thus, over time, members' initial concerns about creating a bad impression by being "wrong" are outweighed by their motivation to ensure that their team is successful. When this occurs, studies have shown that 98 percent of teams will outperform their own best member on learning-related tasks (Michaelsen, Watson, & Black, 1989).

Groups Must Be Formed by the Teacher

Given the requirements for minimizing barriers to group cohesiveness and evenly distributing resources across teams, the teacher must directly control the group formation process. Even stating a desired group size and then inviting students to form their own groups flirts with disaster. Because of the heavy influence of where students are likely to be sitting when the invitation is given, it is highly unlikely that the resulting groups will have members that will have membership characteristics that will enable them to develop into cohesive teams.

Principle 2: Students Must Be Made Accountable

Establishing accountability requires creating two conditions. One is ensuring that the quality of students' individual and group work can be monitored. The other is ensuring that the quality of their work will have significant consequences (good and bad).

In traditional classes, because there is no real need for students to be accountable to anyone other than the instructor, it is possible to establish a reasonable degree of accountability by simply assigning grades to students' work. By contrast, developing groups into cohesive learning teams requires assessing and rewarding a number of different kinds of student behavior. Students must be accountable for individually preparing for group work, devoting time and effort to completing group assignments, and interacting with each other in productive ways. Fortunately, however, using learning groups also offers opportunities for meaningfully involving students in establishing accountability for these important behaviors.

Accountability for Individual Pre-Class Preparation

The first step in developing cohesive learning teams is making members accountable for pre-class individual preparation. If individual students fail to complete pre-class assignments, they will be unable to contribute to the efforts of their team. Lack of preparedness hinders the development of group cohesiveness, and better students resent having to carry their less willing or less able peers. As a result, effectively using learning groups requires making students accountable for individually preparing for class.

In team-based learning, the basic mechanism that ensures individual accountability for pre-class preparation is the *Readiness Assurance Process* (see Table 2.1, and Michaelsen & Black, 1994) that occurs at the beginning of each major unit of instruction. The first step in the process is an individual Readiness Assessment Test (RAT—typically 18–20 multiple-choice questions) covering a set of pre-assigned readings. Next, students turn in their answers and are given an additional answer sheet so that groups can retake the same test and turn in their consensus answers for immediate scoring. This process promotes students' accountability to both the instructor and to each other. First, students are responsible to the instructor because the individual scores count as part of the course grade (discussed later in detail). Second, during the group test, each member is invariably asked to voice and defend their choice on every question. As a result, students are clearly and explicitly accountable to their peers for not only completing their assigned readings, but also for being able to explain the concepts to each other.

Accountability for Contributing to Their Team

Confirming that members are prepared for group work is an essential first step in ensuring that students contribute to their group in ways that promote learning. The next step is ensuring that members contribute time and effort to group work. To

accurately assess members' contributions to the success of their teams, it is imperative that instructors involve the students themselves in the assessment process. An excellent tool for this kind of evaluation is peer assessment. That is, members are given the opportunity to evaluate one another's contributions to the activities of the team. Contributions to the team include activities such as individual preparation for team work, reliable class attendance, attendance at team meetings that may have occurred outside of class, positive contributions to team discussions, valuing and encouraging input from fellow team members, and so forth. Peer assessment is essential because team members are typically the only ones who have enough information to accurately assess one another's contributions. (See the next part in this chapter and Appendix B for additional information on peer evaluations.)

Accountability for High-Quality Team Performance

The third significant factor in ensuring accountability is developing an effective system to assess the performance of the teams. There are two keys to assessing teams effectively. One is using assignments that require teams to create a "product" that can be readily compared across teams and with "expert" opinions (including those of the instructor—see the following). The other is using procedures to make sure that teams receive frequent feedback on their work.

Accountability and Rewards

Students are, after all, rational human beings who tend to behave in ways they believe will result in positive consequences. Thus, it is essential that we use an assessment system that encourages the kind of behavior that will promote learning in, and from, group interaction. As a result, an effective assessment and reward system requires three elements. One is regular and timely assessment of the extent to which students are prepared for and contribute to their groups. Another is assessing the quality of the work done by groups. Finally, irrespective of the extent to which students are involved in the assessment process, a significant proportion of students' grades should be based on the behaviors that are needed to promote high-quality group interaction. Thus, creating cohesive and effective learning teams requires using a grading system in which individual members' contributions to the success of their teams, and team performance, are assessed and rewarded (see pp. 88–90 and Appendix A).

Principle 3: Team Assignments Must Promote Both Learning and Team Development

The development of appropriate group assignments is a critical aspect of successfully implementing team-based learning. In fact, most of the reported "problems" with learning groups (free-riders, member conflict, etc.) are the direct result of inappropriate

group assignments. When bad assignments are used, poor results are both predictable and very nearly completely preventable. In most cases, the reason that group assignments produce problems is that they are not really group assignments at all. Instead, individuals working alone rather than members working together as a group do the actual work. Further, since discussion time is so limited, these kinds of assignments both inhibit learning and prevent, rather than promote, team development.

The most fundamental aspect of designing effective team assignments is ensuring that they truly require group interaction. In most cases, team assignments will generate a high level of interaction if they require teams to use course concepts to make decisions that involve a complex set of issues, and enable teams to report their decisions in a simple form. When assignments emphasize making decisions, intragroup discussion is the natural and rational way to complete the task. However, assignments that involve producing complex output such as a lengthy document are likely to limit discussion because the rational way to complete the task is to divide up the work and have members individually complete their part of the total task. Therefore, tasks that can be divided among team members should always be avoided. (A thorough discussion of effective team assignments follows in Chapter 3).

Principle 4: Students Must Receive Frequent and Immediate Feedback

Providing immediate feedback is key to successful team-based learning for two very different reasons. One that is well documented in the education literature is that feedback is essential to content learning and retention (e.g., Bruning, Schraw, & Ronning, 1994). The other, that is seldom mentioned in the education literature but well documented in the small groups research literature (see chapter 4, pp. 90–91), is that feedback is important because of its impact on group development. Further, the positive impact of feedback on both learning and team development is greater when it is immediate, frequent, and discriminatory (i.e., enables learners to clearly distinguish between good and bad choices, effective and ineffective strategies, etc.).

Timely Feedback from the Readiness Assessment Tests

The Readiness Assessment Tests (RATs, as mentioned previously and discussed in detail later in this chapter) are an excellent example of the importance of feedback for both learning and team development. Because they are given at the beginning of each major instructional unit, feedback from the RATs facilitates the shift from concept coverage to concept applications by allowing the instructor to minimize the time devoted to ensuring that students have the conceptual skills required for completing the application focused assignments. In addition, feedback from the RATs facilitates the team development process in two important ways. One is that because the group scores are made public, group members are highly motivated to pull together to protect their public image. The other way in which the RATs build group cohesiveness is

that the immediate feedback on both the individual and group scores enables the groups to learn how to work together more effectively. Because the feedback is immediate, students are both aware of situations when the group failed to capitalize on the knowledge of one or more of their members, and are highly motivated to do something about it (Watson et al., 1991). As a result, they very quickly learn the importance of including everyone in the decision making process. Thus, over time, naturally extroverted or more assertive members do more listening and less talking, quieter students become much more active in team discussions, and cohesiveness increases because members develop a genuine appreciation of each other's contribution to their group's success.

Timely Feedback on Application-Focused Team Assignments

Providing immediate feedback on application-focused team assignments is just as important for both learning and team development, but typically presents a much greater challenge than providing immediate feedback on the RATs. Unlike the RATs, which are designed to ensure that students understand basic concepts, most application-focused team assignments are aimed at developing students' higher-level learning skills and, as a result, can be much more difficult to evaluate. One key to providing immediate feedback on application-focused team assignments is requiring the right kind of output from the teams (i.e., assignments that require students to make complex decisions, but represent their work in a simple form). The other is using procedures that enable teams to assess and provide feedback on each other's work.

For most teachers, designing application-focused assignments that enable timely feedback requires modifying both their assignments and the way they use them. Fortunately, the task of modifying assignments so that they facilitate timely feedback (and team accountability) is fairly straightforward once you understand the key elements in the process. The kinds of changes that typically need to be made can be illustrated by the experience of a colleague who teaches in a medical school.

As a professor in a medical school, this teacher used a series of case files to develop medical students' diagnostic skills. For many years, she assigned groups to write a series of one-page memos identifying a preliminary diagnosis for the patient portrayed in each case. She was, however, always disappointed in the learning outcomes. Her disappointment was a result of the fact that students only worked with a fraction of the cases because groups delegated the work to individual members. In addition, given the large size of the class, correcting the assignment took so long that students were more interested in their grade than the substance of the papers.

Because of her disappointment with the learning outcomes, the teacher modified the assignment and was much more pleased with the results. Her modifications include the following changes. Although she still has students read the same cases, she has changed the team assignments so that the emphasis is on *deciding* rather than writing. She also changed classroom management procedures to enable groups to become involved in the assessment and feedback process. For example, first, she pre-assigns the same set of cases. Then, in class, she adds a vital piece of new information

to the assigned case and gives teams a specified length of time to either select a most likely diagnosis from a limited set of alternatives, or commit to a position that they do not have enough information to make a definite diagnosis. When the time for deciding has elapsed, the teacher has teams hand in a one-page form on which they report their choice and the key items of evidence that support their conclusion (for grading purposes). Then she gives a signal and the teams simultaneously hold up a legal-sized sheet of paper to reveal their choices to the class as a whole. The outcome of the assignment in this form is a series of lively discussions. The discussions first occur within the teams. Then there is always a vigorous interchange between groups as students challenge the rationale for each other's choices. Further, the give-and-take discussion in both phases fosters concept understanding and team cohesiveness.

The Four Essential Principles: Summary Comments

Although learning groups have positive effects on students' engagement and learning in most courses, their educational value is dependent on two conditions. One is the extent to which students are motivated to prepare for group work. Peer teaching simply cannot occur unless the "teachers" have something to teach (i.e., no amount of discussion can overcome absolute ignorance). The other is the extent to which students are willing to engage in give-and-take discussions (i.e., students' individual knowledge is of no value unless they are willing to voice what they know). Although constructive disagreements are essential to significant learning, the level of trust required for members to be willing to challenge each other's views requires a level of cohesiveness and trust that only develops through a series of positive group interactions.

By adhering to the Four Essential Principles of Team-Based Learning, teachers ensure that the vast majority of groups will develop a level of cohesiveness and trust required to transform groups into effective learning teams. Appropriately forming the teams puts them on equal footing and greatly reduces the possibility of mistrust from preexisting relationships between a subset of team members. Holding students accountable for preparation for and attending class motivates team members to behave in ways that build cohesiveness and foster trust. Using assignments that promote both learning and team development provides incentives to motivate members to challenge each other's ideas for the good of the team. Using RATs and other assignments that provide ongoing and timely feedback on both individual and team performance enables teams to develop confidence in their ability to capture the intellectual resources of their members. Also, over time, students' confidence in their teams grows to the point that they are willing and able to tackle difficult assignments with little or no external help.

IMPLEMENTING TEAM-BASED LEARNING

One of the greatest benefits of team-based learning is that teachers are forever freed from the burden of covering all of the course content; instead, it is the students who

do this work. With team-based learning, students spend time studying the material individually before class and then interacting in class with their teammates during the Readiness Assurance Process. This sequence of events ensures that the students gain a strong initial coverage of the content of the course. As a result, they are then prepared to use the majority of class time on assignments aimed at enhancing their ability to apply the knowledge. As a result, effectively using team-based learning typically requires redesigning a course from beginning to end and the redesign process should begin well before the start of the school term.

The redesign process involves making decisions about and designing activities at four different points in time: before class begins, the first day of class, each major unit of instruction, and near the end of the course.

Before Class Begins

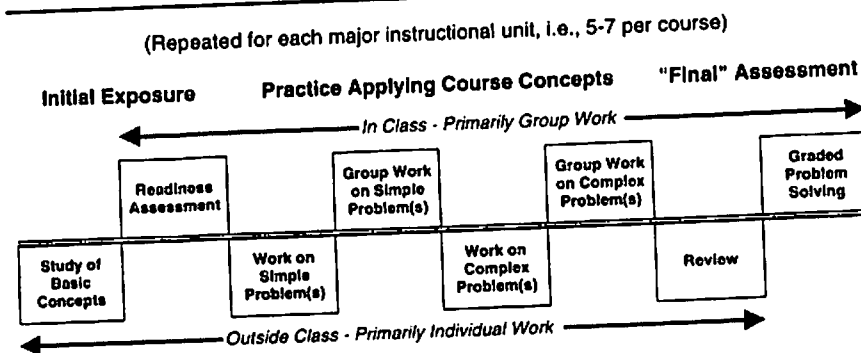
The pre-class work in implementing team-based learning involves making decisions related to issues in the following three categories: (1) partitioning the course content into macro-units, (2) identifying the instructional goals and objectives, and (3) designing a grading system.

Partitioning the Course Content

The first step in the implementation of team-based learning is to partition the course content into four to seven macro-units based on the major topics of the course. These major units of instruction form the basis for defining objectives and for designing both the RATs and the application-focused assignments. Typically, these units consist of two to four chapters from the course text and perhaps additional readings that can be tied together with an overall conceptual theme.

Macro-units of instruction in team-based learning typically involve three different types of in-class activities, each of which is preceded by pre-class preparation by the students. The first type of in-class activity, the Readiness Assurance Process, enables the instructor to ensure that students are familiar with key unit concepts by assessing and extending the level of understanding students achieved after completing the pre-class reading assignment. Next come one or more activities designed to provide students with opportunities to practice (and receive feedback) on actually applying the key unit concepts. Finally, students are typically required to demonstrate their mastery of unit concepts through completing an individual or group application-focused assignment or exam. In other words, students work independently outside of class studying and preparing for each event (i.e., test, assignment, project, etc.) that occurs in class. This sequence of events is illustrated in Figure 2.1. The diagram (fondly referred to as the castle-top diagram) graphically portrays the pattern of activities that occur, over time, during a typical instructional unit. One can readily see the flow of events from out-of-class preparation to in-class tests and assignments.

FIGURE 2.1
Team-Based Learning Instructional Activity Sequence



Identifying the Instructional Goals and Objectives

The second step in redesigning a course for team-based learning is identifying content-related learning objectives for the entirety of the course, each major instructional unit, and often for sub-units as well. If instructors are able to design with their desired end in mind—that is, by determining what they want students to *do* with the ideas and concepts as a result of studying this unit of instruction—they are far more likely to end up, educationally, where they want to be.

With team-based learning, it is important to identify two different types of content-related instructional objectives. The first type of instructional objective, and, by far the most important, involves identifying what students will do with their newly acquired knowledge (see Table 2.1; Michaelsen & Black, 1994). The second type of instructional objective focuses on identifying the course concepts and terminology that students must know in order to achieve the “doing” objectives.

The “doing” objectives are important for two very different reasons. First, because there is not enough time for the teacher to cover all of the material, focusing on how we want students to use their knowledge is an extremely powerful and reliable aid in deciding which elements of the course content are really important. Second, although most students are willing to put in the effort needed to understand basic concepts, they are likely to rebel at the expectation that they should be primarily responsible for their initial exposure to course content unless they know why the concepts are important. If the only payoff from the students’ pre-class study and reading is covering more meaningless minutia (at least in their minds), they are likely to complain about “having to pay tuition to be in a class where the teacher doesn’t teach.” On the other hand, if studying the basics on their own enables them to work on challenging and relevant application-focused assignments (e.g., see Michaelsen & Black, 1994), most students both appreciate and support what the teacher is trying to do. As a result, the instructor must have a clear answer to the question, “What do I want

TABLE 2.1
Readiness Assurance Process

- 1) **Assigned Readings.** In most instances, the students are initially exposed to concepts through assigned readings.
- 2) **Individual Test.** Additional exposure during the individual test helps reinforce students' memory of what they learned during their individual study (for a discussion of the positive effects of testing on retention see Nungester & Duchastel, 1982).
- 3) **Team Test.** During team tests, students orally elaborate the reasons for their answer choices. As a result, they are exposed to peer input that aids in either strengthening or modifying their schemata related to key course concepts. In addition, they gain from acting in a teaching role (for a discussion of the cognitive benefits of teaching see Bargh & Schul, 1980; Slavin & Karweit, 1981).
- 4) **Appeals.** During this step students are given the opportunity to restore credit for questions missed on the team test by making a successful written appeal. Because students have the opportunity to increase their score, they are highly motivated to engage in a focused re-study of troublesome concepts.
- 5) **Oral Instructor Feedback.** Steps 1-4 ensure that the instructor is aware of students' level of concept understanding. In step 5, the instructor provides feedback and corrective instruction that is specifically aimed at resolving any misunderstandings that remain after students have done the focused review in preparing the appeals.

students to be able to do when they have finished the course?" Otherwise, I would strongly recommend against using team-based learning. However, if instructors are able to articulate higher-level objectives, they are well on their way to being a successful user of learning teams.

Designing a Grading System

The third step in redesigning the course is to ensure that the grading system is designed to reward the right things. An effective grading system for team-based learning must address the concerns of both students and the instructor. For both, the primary concern is related to past situations in which too many groups have had free-riders. Students worry that they will be forced to choose between getting a low grade or getting a higher grade—but at the expense of carrying their less able or less-motivated

peers. Instructors worry that they will have to choose between grading rigorously and grading fairly.

Fortunately, both sets of concerns tend to be alleviated by a grading system in which a significant proportion of the grade is based on: (1) individual performance, (2) team performance, and (3) each member's contributions to the success of their teams. Having a significant part of the grade based on each of the first two principles is key to ensuring that students will be rewarded for their individual effort and that teams will have the resources they need to complete team assignments. In other words, having part of the grade based on team performance provides an incentive for students to invest the time and effort needed to complete (and learn from) the team assignments. Students must first perceive that each of the factors (i.e., individual performance, team performance, and members' contributions to the success of their teams) is important to their course grade. After that, the only concern left is that the relative weight of the factors is acceptable to both the instructor and the students.

The First Hours of Class: Getting Started on the Right Foot

Activities that occur during the first few hours of class are critical to the success of team-based learning. During that time, the teacher must see that four objectives are accomplished. The first objective is to lay the groundwork for team-based learning in general. That is, team-based learning must be explained to the students to ensure their understanding of why the teacher is using team-based learning, and how the class will be conducted. The second objective is to actually form the groups. The third and fourth objectives include alleviating students' concerns about the grading system and setting up mechanisms to encourage the development of positive group norms.

Laying the Groundwork for Team-Based Learning

Because team-based learning is so fundamentally different from traditional courses, it is important that students understand both how the class will be conducted and the rationale for this approach to learning. Educating the students about team-based learning requires (at a minimum) providing students with information about the grading system and the sequence of assignments. This information should be printed in the course syllabus and presented orally by the teacher.

In order to foster students' understanding of team-based learning, I typically use two activities that work quite well. The first, which I always use on the first day, involves the use of an overhead transparency (or a PowerPoint presentation). This presentation describes how learning objectives for this course will be accomplished through the use of team-based learning, as compared to a course that is taught with a more traditional approach. (see Appendix D–A1.1 and D–A1.2). The second activity that, with class periods of less than an hour, might occur on the second day, involves using part of the first class as a demonstration of a Readiness Assessment Test with the

course syllabus as the “content” material to be covered. That is, as soon as I have formed the groups, I have students read the course syllabus (on the spot) and then take an individual test over the contents of the syllabus. That test is followed by a group test. The tests are a simulation of the Readiness Assessment Tests the students will be taking during the semester.

Forming the Groups

As discussed, two factors that must be taken into consideration when forming the groups are the assets and liabilities of the students, and the potential for the emergence of sub-groups. As a result, the starting point in the group-formation process is to gather information about the specific student assets and student liabilities that could potentially impact student performance in this class. Assets and liabilities for a particular course might include such things as work experience, previous relevant course work, access to perspectives from other cultures, and so on.

The second factor that can impact student performance in a group is the emergence of sub-groups, for example, boy- or girlfriends, sorority or fraternity members, ethnic groups, and so forth. Regardless of the process used to form the groups, both of these categories of individual member characteristics need to be evenly distributed across the groups.

After student characteristics have been identified, actually assigning students to groups can be done in a variety of ways. The first decision that must be made, however, is the size of the groups. As discussed earlier, the groups should be composed of five to seven members. This ensures that the vast majority of groups will have ample resources (i.e., input from individual students). Once group size is determined, it is time to begin the process of distributing individual member characteristics across the groups.

One common practice is to collect the relevant student information on a set of cards. Then, before the second class, the teacher uses the information on the cards to sort students into specific groups. This method has the advantage of giving the teacher time to work out the group assignments. Its disadvantage, however, is that students tend to wonder how much the instructor might have somehow given one or more of the groups an unfair advantage.

Although using student information to form groups outside of class works very well, I recommend actually forming the groups in class in the presence of the students. This procedure virtually eliminates student concerns about any ulterior motives the instructor may have had in forming the groups.

To form groups in class, the teacher begins the process by simply asking questions about the factors that are important to group success. For a class in management, typical questions could include, “How many of you have four or more years of full-time work experience?” “How many have access to a laptop computer you can bring to class?” “In which country did you attend high school? and other queries. Students respond to each of the questions either orally or with a show of hands. Then students possessing a series of specific assets are asked to form a single line around the perime-

ter of the classroom with the rarest or most important category at the front of the line. After students are lined up, they simply count off down the line by the total number of groups in the class. All “ones” become Group 1, all “twos” become Group 2, and so on. With this simple method, individual student characteristics have been easily distributed across the teams (see video clip at www.teambasedlearning.org).

Alleviating Student Concerns about Grades

The next step in getting started on the right foot with team-based learning is to address student concerns about the grading system. For the most part, students’ uneasiness about grades in a group-oriented course are based on past experience in which they have been forced to choose between carrying the group or getting a bad grade. Fortunately, their anxiety largely goes away when they understand two of the essential features of team-based learning. One is that two elements of the grading system—“counting” individual scores on the RATs and basing part of the grade on a peer evaluation—create a high level of individual accountability for pre-class preparation and class attendance. The other is that there is little danger that one or two less-motivated members can put the group at risk because the team assignments will be done in class and will require thinking, discussing, and deciding.

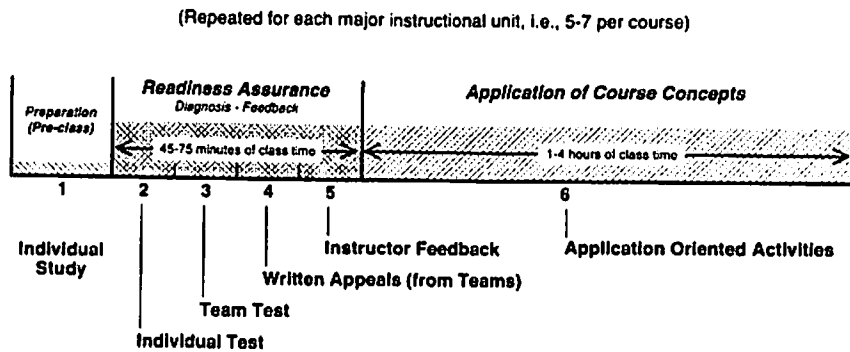
Based on years of experience, the most effective way to alleviate student concerns about grades is to directly involve them in the development of the grading system. Students become involved by participating in an exercise called “Setting Grade Weights” (Michaelsen, Cragin, & Watson, 1981; see Appendix C). Within limits set by the instructor, representatives of the newly formed teams negotiate with one another to reach a mutually acceptable set of weights for each of the grade components: individual performance, team performance, and members’ contributions to the success of their teams. After an agreement has been reached regarding the grade weight for each component, the standard applies for all groups for the remainder of the semester.

Involving students in the process of setting grade weights is highly effective because it is an immediate demonstration of just one of the ways that instructor and student roles in this class will be different from most other classes. It also helps to ensure that students truly understand a grading system that counts group performance and peer evaluation as essential components. As group members work together to reach an agreement about grade weights, they are beginning the team-building process.

Each Major Unit of Instruction

Units of instruction in team-based learning (approximately 6–10 class hours) follow the activity sequence shown in Figure 2.2. Each of the in-class activities should be designed to accomplish two ends. One is to build students’ understanding of course content. The other is to increase group cohesiveness to the point that the majority of the groups successfully develop into self-managed learning teams.

FIGURE 2.2
Team-Based Learning Instructional Activity Sequence



Ensuring Content Coverage with the Readiness Assurance Process

In team-based learning, the basic mechanism to ensure that students are exposed to course content is the Readiness Assurance Process. This process occurs five to seven times per course and constitutes the first set of in-class activities of each major instructional unit. It also provides the foundation for individual and team accountability as one of the building blocks of team-based learning as mentioned earlier. The Readiness Assurance Process has five major components: (1) assigned readings, (2) individual tests, (3) group tests, (4) an appeals process, and (5) instructor feedback (Figure 2.2). Each of the individual components is discussed in the following paragraphs.

Assigned readings. Prior to the beginning of each major instructional unit, students are given a reading assignment that is to be completed outside of class. The readings should contain information on the concepts, issues, and ideas that students should understand by the conclusion of the instructional unit. The readings constitute the first component of the Readiness Assurance Process. Students are to complete the readings and come to the next class period prepared to take a test covering the material they have just read.

Individual tests. The first in-class activity in each instructional unit is the Readiness Assessment Test (RAT) over the set of assigned readings. The RATs typically consist of short true-false or multiple-choice questions that provide the opportunity for peer teaching and enable the instructor to assess whether or not students have a sound understanding of the key concepts from the readings. As a result, the RAT questions should focus on foundational concepts (and avoid picky details), but be difficult enough to create discussion within the teams (see Appendix A for information on how to create effective RATs).

Team tests. When students have finished the individual RAT, they turn in their answers and immediately proceed to the third phase of the Readiness Assurance

Process. During the third phase, students retake the same test, but this time as a group. And to complete the group test, members must reach agreement on each test question. As an integral part of the Readiness Assurance Process, the discussion required to choose a group answer both serves as an excellent review of the readings and provides the opportunity for peer teaching.

In addition, the feedback members receive from each other—immediate scoring of the team RATs—provides students with a means of discovering misunderstandings either on a question-by-question basis using IF-AT answer sheets (Epstein, 2000) or as soon as the team test is completed (see Appendix A for a discussion of alternative methods for quickly scoring the RATs). As soon as the team tests are completed and scored, students pick up their individual answer sheets (the individual tests are scored *during* the group tests) so that they have concrete and immediate feedback on both individual and team scores. Thus, by comparing individual and team answer sheets, they know how effective they have been in using the intellectual resources of group members. At this point, the teacher (or a group member) also posts their group scores on the board; however, individual scores remain anonymous. Public posting of the team scores allows students to monitor their performance by making comparisons between their scores and those of their peers.

Appeals. At this point in the Readiness Assurance Process, students proceed to the fourth phase. This phase gives students the opportunity to refer to their assigned reading material to appeal any questions that were missed on the group test. That is, students are allowed to do a focused re-study of the assigned readings to challenge the teacher about their responses on specific items on the group test or about confusion created by either the quality of the questions or inadequacies of the pre-class readings. Discussion among group members is usually very animated while the students work together to “build a case” to support their appeals. The students must produce compelling evidence to convince the teacher to award credit for the answers they missed on the group test. Again, as an integral part of the Readiness Assurance Process, this exercise provides yet another review of the readings. This time, however, the review is specifically focused on the material that needs additional clarification, that is, the material related to the questions that the teams answered incorrectly.

Instructor feedback. The fifth and final part of the Readiness Assurance Process involves oral feedback from the instructor. This feedback comes immediately after the appeals process and allows the instructor to clear up any confusion students may have about any of the concepts presented in the readings. As a result, input from the instructor is typically limited to a brief, focused review of only the most challenging aspects of the pre-class reading assignment.

The Readiness Assurance Process in summary. The Readiness Assurance Process allows instructors to virtually eliminate class time that is often wasted in covering material that students can learn on their own. Time is saved because the instructor's input occurs after students have: (1) individually studied the material, (2) taken an individual test focused on key concepts from the reading assignment, (3) retaken the same test as a member of a learning team, and (4) completed a focused re-study of the

most difficult concepts. As a result, the instructor is aware of any specific concepts that need additional attention so that he or she can correct students' misunderstandings and still have ample time to allow students to tackle the application-oriented assignments to develop students' higher-level learning skills.

It is also important to emphasize the significance of the Readiness Assurance Process for developing and using learning teams. In fact, the Readiness Assurance Process is the backbone of team-based learning because of its effect on team development. The RATs are the single most powerful team development tool I have ever seen because they promote team development in four specific areas. First, starting early in the course (usually in the first few class hours) the students are exposed to immediate and unambiguous feedback on both individual and team performance. As a result, each member is explicitly accountable for his or her pre-class preparation. Second, because team members work face-to-face, the impact of the interaction is immediate and personal. Third, students have a strong vested interest in the outcome of the group and are motivated to engage in a high level of interaction. The strong interest results from the fact that the students receive both intrinsic and extrinsic rewards for successful team performance. Finally, cohesiveness continues to build during the final stage of the process, that is, when the instructor is presenting information. Groups become more cohesive because, unlike lectures, the content of the instructor's comments is determined by the results of the RATs and is specifically aimed at providing value-added feedback to the teams.

Even though the impact of the Readiness Assurance Process on student learning is limited primarily to ensuring that they have a solid exposure to the content, it is still an extremely valuable teaching and learning activity because it creates a feedback-rich learning environment. By encouraging pre-class preparation and intensive give-and-take interaction, this process also increases students' ability to solve difficult problems. Pre-class preparation and lively discussion build the intellectual competence of team members and enhance students' ability and willingness to provide high-quality feedback to one another. This, in turn, is an invaluable tool for instructors because it dramatically reduces the teacher's burden of providing feedback to individual students. As a result, the Readiness Assurance Process provides a practical way of ensuring that, even in large classes, students are exposed to a high volume of immediate feedback that, in some ways, is actually better than having a one-on-one relationship between student and instructor (e.g., Vygotsky, 1978).

Promoting Higher-Level Learning with Application Exercises

The next stage in the team-based learning instructional activity sequence for each unit of instruction is one or more assignments that provide students with the opportunity to deepen their understanding by using the concepts to solve some sort of a problem. As previously outlined, good application-focused group assignments foster give-and-take discussions because they focus on decision making (not writing) and enable students to share their conclusions in a form that enables prompt cross-team comparisons and feedback.

TABLE 2.2
Examples of Decision-Based Assignments

From a list of 2-5 plausible, but differentially defensible, outcomes that are related to the concepts of the course and have students choose the one that would be most affected by (plug in an example from the list below):

- A specific temperature increase [in a course in chemistry or botany].**
- A Democratic victory in the next election [in a course in sociology or political science].**
- A specific increase in the primary lending rate [in a course in economics or finance].**

Several examples of potential application-focused assignments meeting these criteria are shown in Table 2.2. In each case, the assignment requires teams to use course concepts to make a complex decision that can be represented in a simple form. As a result, because each of these assignments could be implemented so that teams could receive prompt and detailed peer feedback on the quality of their work, they would also enhance both learning and team development. Learning would increase because students would be forced to reexamine (and possibly modify) their assumptions and interpretations of the facts and the teams would become more cohesive as they pulled together in an attempt to defend their position.

Encouraging Positive Team Norms by Tracking Attendance and Performance

Learning teams will only be successful to the extent that individual members adopt the two most critical group norms: pre-class preparation and class attendance. Fortunately, if students have ongoing feedback emphasizing the fact that pre-class preparation and class attendance are critical to their team's success, these norms will pretty much develop on their own. One very simple, yet effective, way to provide such feedback to the students is through the use of team folders. The folders should contain an ongoing record of members' attendance, along with the individual and team scores on the RATs and other assignments (see Appendix D, Exhibit D-B1.1). The act of recording the RAT scores and attendance data in the team folders is particularly helpful because it ensures that every team member knows how every other team member is doing. Members also know how their group is faring compared to the rest of the groups. This comparison of scores reinforces acknowledgment of the dependence of the group on each individual member's input. This recognition of the significance of each member's contribution to the team strongly encourages the development of positive team norms.

Near the End of the Term

Although team-based learning provides students with multiple opportunities for learning along the way, instructors can solidify and extend student understanding of both course content and group process issues by using specific kinds of activities near the end of the term. These are activities that cause students to reflect on their experience during the past semester. Their reflecting is focused on several different areas. In most cases, these end-of-the-semester activities are aimed at reminding students of what they have learned about the following:

1. Course concepts;
2. Concept applications;
3. Value of teams in tackling intellectual challenges;
4. Kinds of interaction that promote effective team work;
5. Themselves.

Learning about Course Content

One of the greatest benefits of using team-based learning is also a potential danger. Since so little class time is aimed at providing students with their initial exposure to course concepts, many tend to forget how much they have learned and, based on the reduced volume of lecture notes alone, some may actually feel that they have been cheated. An effective way to prevent this potential problem is to devote a class period to a concept review. In its simplest form this involves: (1) giving students an extensive list of course concepts (usually on a single sheet), (2) asking them to individually identify any concepts they do not recognize, (3) compare their conclusions in the teams, and (4) review any concepts that teams identify as needing additional attention.

Understanding Content Applications

The best way to remind students that they are able to actually apply course concepts is to have them use course concepts in solving a series of meaningful problems. In some cases, the application-focused assignments associated with individual instructional units may not be complex enough to enable students to see them as more than hypothetical situations. By the end of most courses, however, instructors can largely solve this problem by assigning teams to solve problems that are both increasingly unstructured and require using concepts from multiple content areas. For example, a common activity for a specific unit of instruction for students in a statistics course would be to decide whether or not some treatment had produced a significant result in a given situation. Later, the instructor might enrich the students' understanding by using a case in which different groups were using statistics to argue for different policies and asking them to decide which group had the soundest argument for their position. In my own courses, I often use novels and full-length feature films

to provide a complex setting in which students can practice integrating a wide range of management and organizational behavior concepts.

Learning about the Value of Teams

Although concerns about the better students being held back by less motivated or less able peers are commonplace with other group-based instructional approaches, team-based learning enables instructors to provide compelling empirical evidence of the value of teams for tackling difficult intellectual challenges. For example, in taking the individual and team RATs, students generally have the feeling that the teams are outperforming their own best member, but they are seldom aware of either the magnitude or the pervasiveness of the effect. Near the end of each term, I create a transparency that shows five cumulative scores from the RATs for each team—the low, average, and high member score, the team score, and the difference between the highest member score and the team score (see Appendix D, Exhibit D–A7.3). Most students are literally stunned when they see the pattern of scores for the entire class. In the past fourteen years, over 99 percent of the teams have outperformed their own best member by an average of nearly 11 percent. In fact, in the majority of classes, the lowest team score in the class is higher than the best individual score in the entire class (e.g., see Michaelsen, Watson, & Black, 1989).

Recognizing Effective Team Interaction

Over time, teams get better and better at ferreting out and using members' intellectual resources in making decisions (e.g., Watson et al., 1991). However, unless instructors use an activity that prompts members to explicitly think about group process issues, they are likely to miss an important teaching opportunity. This is because most students, although pleased about the results, generally fail to recognize the changes in members' behavior that have made the improvements possible.

I have used two different approaches for increasing students' awareness of the relationship between group processes and group effectiveness. The aim of both approaches is to have students reflect on how and why members' interaction patterns have changed as their teams became more cohesive. One approach is an individual assignment that requires students to:

1. review their previous observations about the group;
2. formulate a list of "changes or events that made a difference";
3. share their lists with team members;
4. create a written analysis that addresses barriers to team effectiveness and keys to overcoming them.

The other, and more effective approach, involves the same assignment, but having students prepare along the way by keeping an ongoing log of observations about how their team has functioned (see Hernandez, 2002).

Learning about Themselves

One of the most important contributions of team-based learning is that it creates conditions that can enable students to learn a great deal about the way they interact with others. In large measure, this occurs because of the extensive and intensive interaction within the teams. Over time, two important things happen. One is that members really get to know each other's strengths and weaknesses and, as a result, have clear insights of what kind of feedback is needed. The other is that, in the vast majority of teams, members develop such strong interpersonal relationships that they feel morally obligated to provide honest feedback to each other.

Although students learn a great deal about themselves along the way, the instructor can have a significant positive impact on many students' understanding of themselves by using a well-designed peer evaluation process. In its simplest form, this involves formally collecting data from team members on how much and in what way they have contributed to each other's learning and making the information (but not who provided it) available to individual students.

Some prefer collecting and "feeding back" peer evaluation data two or more times during the term (usually in conjunction with major team assignments). Others (myself included) favor involving teams in developing peer evaluation criteria part way through the term but only collecting the peer evaluation data at the very end of the term. The biggest advantage of collecting and feeding back peer evaluation data along the way is that it gives students the opportunity to make changes. The disadvantage is that having students formally evaluate each other can measurably disrupt the team development process. (See Appendix B for a discussion of these issues and copies of instruments that can be used to collect peer evaluation data).

BENEFITS OF TEAM-BASED LEARNING

Using groups, even in a casual way, produces benefits that cannot be achieved with students in a passive role (see Bargh & Schul, 1980; Fiechtner & Davis, 1985; Slavin & Karweit, 1981). While even the casual use of groups is beneficial, it must be stressed that team-based learning allows the achievement of important outcomes that simply cannot be obtained with temporary groups or occasional group activities (e.g., see Michaelsen, Jones, & Watson, 1993; Watson et al., 1991). Some of these include: (1) developing students' higher-level cognitive skills in large classes, (2) providing social support for at-risk students, (3) promoting the development of interpersonal and team skills, and (4) building and maintaining faculty members' enthusiasm for their teaching role.

USING LEARNING TEAMS IN LARGE CLASSES

A key advantage of learning teams is that they can be used to offset many of the disadvantages of large classes (see Chapter 11, and Michaelsen, Watson, Cragin, &

Fink, 1982). In fact, developing and using learning teams may be the only means for building students' higher-level cognitive skills in large classes (see Kurfiss, 1988). Team-based learning is also effective in motivating attendance, handling discipline problems, and engaging members who would benefit from group work but, given the opportunity, would rather work alone (e.g., see Light, 1990). Although temporary groups can provide a valuable aid in small classes where the instructor's physical presence is sufficient to ensure that no one "escapes" (either physically or mentally) and that students are actually working on assigned tasks, they simply cannot exert enough influence on their peers to motivate attendance, handle discipline problems, engage members, and so on.

Increased Social Support for Various Types of At-Risk Students

Students in team-based learning classes have a social support base that is beneficial in multiple ways, unlike temporary groups whose social support typically ends when the class period is over. For example, group-based instructional approaches have been shown to reduce stereotypes of racial and ethnic minorities and physically handicapped students (Johnson, Johnson, & Maruyama, 1983) and increase self-esteem (Johnson & Johnson, 1983). In most classes, the social interaction, which is a natural part of team-based learning, provides benefits to students who often do not feel at ease in a traditional classroom. For example, international students often find lasting friendships and grow in their understanding of a new culture; older students discover that their accumulated life awareness is an appreciated and valuable asset; students who are at risk of dropping out form working relationships that continue to be of help in future assignments and other classes; and students who are having difficulty maneuvering their way through the campus bureaucracy have a ready source for answers to their questions and concerns.

Development of Interpersonal Skills

Students also benefit from interacting in a situation in which group work really counts. Unlike temporary groups, in which tough interpersonal issues can be avoided simply by waiting until the groups are re-formed, students in team-based learning classes cannot easily escape the problems they encounter in their groups. As a result, many learn lessons about themselves that allow them to be more effective and productive when they finish school and enter the work force. For example, students who are intellectually capable, but socially unskilled, learn through being exposed to more positive role models and through input from peers who have enough at stake that they are willing to give them helpful (but not always positive) feedback. In addition, because students have to learn to work together, they develop the understanding and skills they need to work productively as task-group members. Finally, part of effective group work is believing that the benefits of working in groups outweighs the costs.

Unlike groups used in a supplementary way, the vast majority of team-based learning groups provide solid evidence of the terrific potential of effective learning teams for accomplishing difficult intellectual tasks.

Building and Maintaining an Enthusiasm for Teaching

Probably the greatest benefit of team-based learning is that it has a tremendous positive impact on the instructor. Being responsible for creating enthusiasm and excitement about basic, but essential, material is a burden that few are able to carry for long without burning out. As a result, even the most dedicated and talented instructors are likely to try to find ways of reducing their teaching load. With team-based learning, however, the groups handle most of the aspects of teaching that, for most, are simply drudgery. For example, the instructor almost never has to go over basic concepts or answer simple questions. The RATs handle that task with ease and many of the remaining questions, even in basic courses, are challenging enough to be interesting. In addition, instructors rarely have to worry about attendance problems. Students come to class because they want to.

Another reason that team-based learning builds enthusiasm for teaching is that most of the necessary changes are structural in nature. Instead of trying to make one's presentations more interesting and exciting, the major emphasis with team-based learning is on designing courses to give students opportunities and incentives to accept more responsibility for ensuring that learning occurs. Thus, the focus of the instructor shifts from "How should I teach?" to "How can students best learn?" and the challenge for instructors has to do with designing courses and group activities with that new and different perspective in mind.

Finally, team-based learning also produces instructor enthusiasm because it taps into the energy that is released as the student groups develop into learning teams. Although there are typically some initial struggles, most groups' capabilities steadily improve to the point that students behave more like colleagues than "empty vessels." This is the natural outcome of empowering groups by structuring them so that they have needed resources, are exposed to appropriate performance evaluation systems, and have the opportunity to engage in meaningful and challenging assignments. As a result, the vast majority of students willingly share responsibility to ensure that learning occurs. When this happens, teaching with team-based learning is simply more fun.

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