JECT Special Issue on Learning Groups, Authors and Working Titles


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Abstract

This essay addresses three questions: 1) What are the foundational practices of Team-Based Learning (TBL)?, 2) What are the fundamental principles underlying TBL’s foundational practices? and, 3) In what ways are TBL’s foundational practices similar to and/or different from the practices employed by Problem-based Learning (PBL) and cooperative learning (CL)? Most of the TBL vs. CL and PBL comparisons are organized in relation to the size of and strategies for forming groups/teams, strategies for ensuring that students are familiar with the course content, the nature of the group/team assignments, the role of peer assessment and, the role of the instructor.

Introduction

Faculty members today are confronted with multiple, often conflicting, demands from various constituents. One of the most pervasive is an increased emphasis on securing external funding. Due to the reduction of funding from government sources, many universities are placing serious pressure on faculty to secure grant funds to ensure financial sustainability. Subsequently, many of these same universities are asking faculty to teach larger classes in order to keep costs down while simultaneously pushing for more effective teaching to keep ensure student course satisfaction and increased enrollment.

Further straining faculty workloads, today’s students are entering collegiate classes with a very different set of expectations and study habits than previous generations of students. Employers of our graduates often complain about what their new employees don’t know and can’t do, urging us to teach them a wider range of skills, capabilities, and attitudes, e.g., a more positive attitude towards diversity and teamwork (David, David & David, 2011; Hart Research Associates, 2008; Polk-Lepson Research Group, 2012). In addition to the increased instructional needs, the size and range of course textbooks continue to expand annually as a result of emerging research. This also places additional demands on content knowledge faculty are responsible for covering.

As a result of these compounding challenges, the question emerged, “How can faculty accommodate all of these different demands and pressures?” This essay will describe why and how a specific form of teaching can address most if not all of these difficult and potentially conflicting challenges. This special form of teaching, Team-Based Learning (TBL)—see Michaelsen, Knight & Fink, 2004, Michaelsen, Parmelee, McMahon & Levine, 2007, Michaelsen, Sweet & Parmelee, 2008, Sweet & Michaelsen, 2012, Sibley & Ostafichuk, 2013) has proven to be a practical and effective strategy for addressing these challenges and transforming our classrooms into a more enjoyable experience for teachers and students alike.

Two keys to TBL’s effectiveness are: 1) TBL shifts the focus of instruction away from the teacher dispensing information and instead places the focus on students actively engaging in activities which require them to use the concepts to solve problems and, 2) every aspect of a TBL course is specifically designed to foster the development of self-managed learning teams. Thus, in TBL classes, students are actively engaged with each other as they attempt to apply course concepts to solve authentic problems. Further, to the extent that its practices result in the development of effective, self-managed learning teams, TBL is far more powerful practical for fostering both engagement and learning than is possible with either individual interaction between the instructor and his or her students or even other forms of in-class, small group work. These outcomes are only possible because, once developed, the teams provide a powerful intellectual and social foundation for dealing with genuinely challenging problems (e.g. McInerney & Fink, 2003). As a result, TBL courses produce both deep learning and a wide variety of other positive outcomes that include enabling students to develop a deep understanding of the concepts, a sense of responsibility to and for their teammates, a genuine appreciation of the power of team interaction, ethical decision making (McCormack & Garvan, in press) and even improved work performance. (See Haidet, MacCormack & Kubits, 2013 in this volume for a current summary and analysis of the research on TBL to date).

This essay will first outline “how” TBL is able to produce such a wide range of positive outcomes by: 1) describing the foundational practices of TBL and, 2) comparing them with practices employed by two other widely used approaches that rely on small group work— Problem-based Learning (PBL) and cooperative learning (CL). Then the issue of “why” TBL works will be addressed by discussing the key principles involved
in TBL and then contrasting these principles with traditional (i.e., lecture-based) educational practice. The final section will summarize the key similarities and differences between TBL and CL and PBL.

**Foundational Practices of Team-Based Learning**

Four foundational practices are essential for implementing TBL. These are: 1) strategically forming permanent teams, 2) ensuring student familiarity with course content by utilizing a Readiness Assurance Process, 3) developing students’ critical thinking skills by using carefully-designed, in-class activities and assignments and, 4) creating and administering a peer assessment and feedback system. Each of these practices has been described in detail elsewhere (e.g. Michaelsen, et al. 2004, 2007, 2008; Sweet & Michaelsen, 2012) but are briefly described below.

**Strategically Forming Permanent Teams**

To be maximally effective, learning groups in any setting require two very different types of assets that are directly affected by the way teams are formed and managed. First, groups must have sufficient intellectual resources to complete their assigned tasks. Second, the members must interact with each other in productive ways.

In TBL, the team formation and management processes are particularly critical for two reasons. One is that, since the primary objective is developing students higher-level thinking and problem-solving skills, students will be faced with a number of highly challenging assignments. Thus, the groups need to be fairly large (5-7 members) and intellectual assets and liabilities in the class should be evenly allocated across groups in a class. The other is that, in TBL, groups must develop into effective self-managed teams (e.g. Fink, 2004). As a result, the team formation and management process in TBL has two important dimensions. First, the groups must be formed in a way that will minimize potential disruptions from cohesive sub-groups (e.g. pre-existing friendships, etc. – options for forming TBL groups can be found in a variety of places including Michaelsen, et al. 2004, 2007, 2008, Sweet & Michaelsen, 2012 and the TBL Collaborative web site www.teambasedlearning.org). Second, the membership of the groups must remain stable over a long enough period for the team-development process to come to a fruition (e.g. Michaelsen, Watson & Sharp, 1989, Watson, Kumar & Michaelsen, 1993).

Comparison with PBL and CL: One area in which TBL, PBL and CL are in agreement is that the groups should be purposefully formed by the instructor and, with a few exceptions in specific CL applications, the groups should contain members with diverse points of view. However, TBL differs from both PBL and CL with respect to how to maximize the likelihood that learning groups will have both the intellectual resources and effective social interactions they need to succeed. TBL utilizes larger groups (5-7 members) because of the increased risk that teams of less than 5 members will be resource-deficient when students are faced the wide variety of challenging decision-based tasks that are characteristic of TBL courses (See Levine, Carchedi, Roman, Townsend, Cluver, Frank, Butler, Haidet, Swanson, Borges & Thompson, 2014, Michaelsen, et al. 2004, 2007, 2008, Sweet & Michaelsen, 2012). In CL, the groups are smaller (2-4 members) for two reasons. One is that, in the short run, smaller groups are both more efficient and more effective than larger groups in dealing with many types of tasks. The other is the assumption that appropriately designing the tasks and guiding students’ interactions will compensate for any loss of input that might come from having smaller groups. Most CL tasks are structured to be completed within one class period, and can be handled by groups with 2-4 members. Further, while TBL always uses permanent groups, in CL the duration of the groups is often determined by the tasks they will be asked to complete. For example, a typical think-air-share activity would use short-term groups during a single class period. On the other hand, although none of the CL models require permanent groups, some do use longer-term groups with several weeks duration.

Likewise, TBL, PBL and CL have very different strategies for promoting effective interaction. TBL relies on a team development process that naturally occurs as a result of members receiving immediate and ongoing feedback on their performance. PBL also has larger (5-8+ member) permanent teams but relies on a trained facilitator who, in most cases is also content knowledgeable, to intervene when needed to keep groups on track and moving forward in a productive way (e.g. Major & Eck, 2000). Finally, group work designed in cooperative learning typically relies on a combination of orchestrating positive interaction by assigning member roles (e.g., recorder, summarizer, etc.), structuring interactions (e.g. think-pair-share) and/or teaching group interaction skills through group processing discussions following each group activity (e.g. Millis and Cottel, 1998; also see the articles by Kagan and by Johnson, Johnson, and Smith in this volume).

**Ensuring Concept Familiarity with a Readiness Assurance Process**

The primary learning objective in TBL is to go beyond simply dispensing content and focus on ensuring that students have the opportunity to practice using course concepts to solve problems. Simply put, the primary focus of a TBL classroom is student learning, not faculty teaching. Although some time is spent on ensuring that students master the course content, the vast majority of class time is used for team assignments that focus
on using course content to solve the kinds of problems that students are likely to face when they have to apply course material in real life. Figure 1 (adapted from Parmelee, Hudes & Michaelsen, 2013) depicts the sequence of activities involved in implementing each unit of a TBL course.

Figure 1

A typical TBL course is organized into 5-7 major units each of which begins with a pre-class individual assignment (e.g. readings, Power Points, videos, etc.) that is designed to familiarize students with the key concepts from that unit. The first in-class activity for each unit is a Readiness Assurance Process (RAP) which consists of a short individual Readiness Assurance Test (iRAT) over the key ideas from the pre-class assignment. Following completion of the iRAT, students re-take the exact same Readiness Assurance Test as a team (tRAT) by coming to consensus on their answers. Ideally, they use the IF-AT (see Figure 2) “scratch-off” answer sheets that enable students to receive both real-time feedback on each of their decisions and partial credit for partial knowledge (see Michaelsen, et al, 2008). After reviewing their tRAT scores, if the team feels they can make valid arguments for an answer on which they failed to receive full credit, they then have the opportunity to write evidence-based appeals. The final step in the RAP is an instructor clarification review (usually very short and always very specific) through which the instructor corrects any misperceptions of the material that may still remain as indicated by team test performance and the appeals. The rest of the learning unit is spent with students putting course content to use by working on team applications (tAPPs).
Comparison with PBL and CL: The TBL practice of ensuring content coverage through the RAP is very different than either PBL or CL. Although the RAP phase of TBL and the learning activities in PBL have a similar goal i.e., to ensure students gain a comprehensive understanding of a set of problem-related concepts, the sequence of their instructional activities is exactly the opposite. With PBL, the problem comes first and students’ initial task is to decide what content they need to master through individual research and team discussions (Major & Eck, 2000). By contrast, TBL requires students to first study a set of concepts on their own to prepare for the RAP during which they discuss and clarify and, if needed, receive corrective instruction on the course concepts. Once a content understanding base is in place, students in TBL courses then become immersed in complex problems through which they must work together and, in the process, deepen their understanding of the concepts learned. CL differs from either TBL or PBL in that, instead of being a specified step in the instructional sequence, concept coverage in CL can occur in a variety of ways. These would include lectures, individual study, and/or peer teaching through the use of strategies such as Jigsaw (Davidson & Worsham, 1992; Aronson, 2000).

Using Well-Designed In-Class Team Application Assignments

The final stage in the TBL instructional activity sequence for each unit of instruction is both the most important and the most challenging aspect of implementing TBL (see Figure 1). It involves having groups use the concepts to solve some sort of a problem so that students have the opportunity to enrich their understanding of the concepts as they try to apply them. Two important elements in the application assignments are that they must: 1) foster accountability and 2) promote give-and-take discussion first within and then between teams.

The key to creating and implementing effective team assignments is following what TBL users fondly refer to as the “4 S’s” (see Figure 3). These are: 1) assignments should always be designed around a problem that is Significant to students, 2) all of the students in the class should be working on the Same problem, 3) students should be required to make a Specific choice, and 4) groups should Simultaneously report their choices (see also Ostafochuk, J., 2013 Roberson & Franchini, 2013). Further, these prescriptions apply to all three stages in which students interface with course concepts—individual work prior to group discussions, discussions within groups, and whole-class discussion between groups. The “4 S’s” are explained in greater detail in the following paragraphs.

Significant [to students] problem. Effective assignments must capture students’ interest (e.g. see Parmelee et al., 2013). Unless assignments are built around what they see as a relevant issue, most students will view what they are being asked to do as “busy work” (also referred to as “exercising” by Fink, 2003) and will put forth the minimum effort required to get a satisfactory grade. The key to identifying what will be significant to students is using “backwards design” (Wiggins & McTighe, 1998). This philosophy implies that the actions involved in learning by doing have a greater impact than learning simply by knowing. For example, if you
Instructor identify something you really want students to be able to do and give them the chance to try, it is very likely that your enthusiasm will carry over to your students in a way that rarely happens when you organize your teaching around what you think students should know.

**Figure 3**

**Effective Group Assignments**

![Diagram](image)

Maximum learning occurs when assignments at each stage are characterized by "4 S's":

- **Significant Problem**—Problem involves issues that are significant to students.
- **Same Problem**—Individuals/groups are working on the same problem, case or question.
- **Specific Choice**—Individuals/groups are required to use course concepts to make a specific choice.
- **Simultaneous Report**—Individuals/groups report their choices simultaneously.

**Same problem.** Group assignments are only effective to the extent that they promote discussion and, when groups work on different problems, students have to try to build inter-team discussions even though they are faced with a comparison of "apples and oranges". By contrast, having all of the groups work on the same problem energizes both the within- and between-team discussions. When all of the groups have a common frame of reference, within-groups discussions tend to be more focused and intense because students realize they will be accountable for quality of their thinking. This, in turn, provides an intellectual and emotional foundation for a more conceptually rich and energetic exchange in subsequent discussions between groups.

**Specific choice.** In general, the best activity to challenge students to engage in higher levels of cognitive complexity is to require them to make a specific choice (Michaelsen, et al., 2008; Roberson & Reimers, 2012). In summarizing and synthesizing a wide variety of learning, brain science and education literature, Roberson & Franchini (2013 elsewhere in this volume) conclude that, "The most clarifying action a student can take is making a decision. A decision task integrates components of higher order thinking: analysis of the particular situation to determine competing priorities, values, and lines of reasoning; use of relevant knowledge of concepts, principles, laws or other abstractions at play in the situation; reflective, critical thinking (Are we sure of these facts? Are we sure we understand?) and ultimately an “expert-like” judgment that is expressed in a concrete outcome that can be evaluated.” Team tasks need to point students consistently toward decisions, not simply rehashing information.

Examples of application activities in which students are working with the same problem include the following:

- What is the ideal site for a new dry cleaning business in Norman, Oklahoma and what is the single most compelling reason for your decision? (Michaelsen, et al., 2004)
- What would drug would you recommend to reduce the blood pressure of a patient who is/has (give list of potentially complicating factors)? Why? (Michaelsen & Sweet, 2008)
- Which line on this tax form would pose greatest financial risk due to an IRS audit? (Michaelsen & Sweet, 2008)
- Given a set of real data, which of the following advertising claims is least (or most) supportable? (Michaelsen & Sweet, 2008)
- Given four short paragraphs, which is the best (or worst) example of an enthymeme? Why? (Michaelsen & Sweet, 2008)
Simultaneous reports. Once groups have completed their deliberations on questions like those listed above, it is critical to have them simultaneously reveal their answer choice for two reasons. One reason for simultaneous report is that it provides everyone immediate feedback on how their choices compare to those from other teams and, most importantly, highlights differences among the set of choices. The second reason for simultaneous report is that the team choice is clearly visible to the rest of the class requiring teams to be accountable for, explain, and defend their position. (For a more detailed discussion of options for Simultaneous Reporting, see Sibley, 2012). By contrast when teams report sequentially, the initial report sets a standard that influences all of the subsequent reports because later-reporting teams usually emphasize similarities and downplay differences with the initial team’s position (i.e., “answer drift” – Michaelsen et al, 2008).

Unfortunately, the absence of differences tends to reduce both the amount and intensity of the discussion about differences that is so critical to learning.

Comparison with PBL and CL: The assignments used with other group-based approaches are much less prescriptive and far less application focused than the 4-5 team assignments in TBL. Although finding solutions to authentic, real-world problems are central to both approaches, the functions of both the problems, the solutions and the strategies for providing feedback on the quality of the teams’ work are very different with TBL and PBL. With PBL, the primary focus is on developing students’ understanding as they engage in three quite standard tasks that guide student efforts in relation to each problem situation. These are: 1) identifying content learning goals related to the problem (i.e., what do we need to know to solve the problem), 2) allocating responsibility for conducting the research needed to find information needed to answer the questions they have identified and, 3) once the potentially useful information has been identified, working together to solve the problem. Further, in PBL solving the problem involves making clear conceptual connections between the problem and the information gleaned in members’ research (e.g. Davidson & Major, 2013) and feedback on the quality of the teams’ efforts can come from a variety of sources including the facilitator, other teams who may be assigned to review their work and from self-evaluations using pre-designed rubrics. In TBL, however, solving the problem always involves making a decision. Further, finding a solution (i.e., making a decision) is not the end of the learning cycle. The decisions are then simultaneously reported and provide the basis for teams to receive feedback first from other teams and eventually from the instructor whose initial responsibility is to facilitate inter-team challenges and discussions.

In CL, uses a wider range of activities than TBL including tasks at all levels of the Bloom’s Taxonomy: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). The main requirement is that the tasks or learning activities must be suitable for small group interaction, and are not readily handled by individuals working alone. The three primary specifications for the group tasks are that students have to be clear about what they are discussing, how their conclusions will be reported and how much time they have to discuss the issues activity (e.g. Millis and Cottel, 1998). Concepts can also emerge in CL through exploration in the groups, followed by class discussion to gain a common understanding of the concepts and their critical attributes. CL instructors would agree with the appropriateness of decision tasks to promote higher order thinking, but would also recognize other types of tasks to be legitimate and useful.
Peer Assessment and Feedback

There are four very different reasons that peer assessment and feedback are fundamental to TBL. One is to allay students’ fears about potential “free-riders” that results from previous negative experiences with poorly designed group assignments. In this case, peer evaluations provide some reassurance that peers will have an incentive to do their fair share.

The other three reasons that peer assessment and feedback are fundamental to TBL are related to the fact that the teams are permanent and must become self-managed. First, peer assessment and feedback help members to enhance both each others’ ability to work together effectively (i.e., process-related feedback) and to contribute ideas and information (i.e., content-related feedback). Second, because the teams are working independently, the only individuals who can provide feedback are the team members themselves. Finally, members typically develop working relationships that provide both incentives and opportunities for helping each other develop the interpersonal and teamwork skills that are so important for their future success.

Comparison with PBL and CL: Peer assessment and feedback are far less important for either CL or PBL. With PBL, even though the teams are permanent, there is still less of a need for peer assessment and feedback. Because the group sessions are under the guidance of a trained facilitator: 1) members have far less of a need to

### Table 1
A Comparison of Practices of:
Team-Based Learning, Problem-Based Learning & Cooperative Learning

<table>
<thead>
<tr>
<th>Practice/Strategy</th>
<th>Team-Based Learning</th>
<th>Problem-Based Learning</th>
<th>Cooperative Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Formation and Size</td>
<td>• Instructor-formed • Permanent • Heterogeneous • 5-7 members</td>
<td>• Instructor-formed • Permanent • Heterogeneous • 5-8+ members</td>
<td>• Instructor-formed • Typically-heterogeneous • 2-4 members—may vary with task</td>
</tr>
<tr>
<td>Ensuring Concept Familiarity</td>
<td>Readiness Assurance • iRAT • tRAT • Appeals • Instructor tutorial</td>
<td>Start with Problem • Set research goals • Member research* • Peer teaching in team discussions</td>
<td>Activities Vary • Lecture • Individual study • Jigsaw • etc.</td>
</tr>
<tr>
<td>In-Class Assignments</td>
<td>&quot;4-S&quot; Assignments • Significant problem • Same problem • Specific Choice • Simultaneous report</td>
<td>Start with Problem • Set research goals • Member research* • Peer teaching in team discussions</td>
<td>Activities Require: • Face-to-face interaction • Structured tasks suitable for group work • Interdependence</td>
</tr>
<tr>
<td>Peer Assessment</td>
<td>• Quantitative • Qualitative • Formative • Summative</td>
<td>• Used in some forms of PBL • Under facilitator’s direction</td>
<td>• Feedback during group process/reflection • Peer assessment occasionally used</td>
</tr>
<tr>
<td>Strategies for promoting productive interaction in groups/teams</td>
<td>Develop self-managed teams by: Using • Permanent groups • Grade incentives • Peer assessment and feedback Facilitating immediate performance feedback during/from: • Readiness Assurance • &quot;4-S&quot; assignments</td>
<td>Presence of a trained facilitator who: • Monitors interaction • Provides guidance when needed • Provides feedback to group/members</td>
<td>• Smaller groups • Group structures • Assigned member roles • Post-activity reflection/process discussions • Team/class building activities • Monitoring interaction • Providing guidance when needed • Providing feedback to group/members</td>
</tr>
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* between sessions to gather information for team discussions.
assist in managing the process and, 2) because the students have less responsibility for managing the process, the majority of the feedback is on members’ content-related contributions and, 3) at least part of the feedback comes from the facilitator because he or she is also in a position to monitor the contributions of team members.

In CL, both the incentives and opportunities for peer assessment and feedback are fewer than in TBL for at least three reasons. First, because the groups are smaller, the task of managing the group processes is less complicated and can be handled by a combination of assigning member roles, post-activity process discussions, group structures, or instructor facilitation. Second, there is less emphasis on grading group work in CL than in TBL; some CL models (e.g. Kagan, 2009) never employ group grades. The issue of “free-riders” is critical in all group approaches, but is less related to grades in CL than in TBL or PBL. Finally, because much of the group interaction in CL is affected by role assignments or activity structures or instructor intervention, it is very difficult to sort out which outcomes (or lack thereof) are attributable to the members themselves as opposed to the roles or processing or group structures or instructor influence.

The Instructor’s Role in TBL, CL and PBL

Many of the differences between TBL and other group-based instructional approaches, including CL and PBL stem from the fact that developing effective and self-managed teams is absolutely critical for TBL while self-managed teams are not generally an objective for other approaches. Thus, the TBL instructor’s role consists of creating conditions in which teams will develop the ability to work effectively and independently. The three critical conditions for creating self-managed effective teams are: 1) providing resources (i.e., permanent and strategically formed 5-7 member teams whose members are explicitly accountable for pre-class preparation for the in-class group work), 2) using group tasks that require making decisions and provide the opportunity for immediate performance feedback (i.e., tRATs and 4-S applications), and 3) ensuring that there are incentives (both extrinsic and intrinsic) for individuals to prepare for and participate in group activities and for groups to do high quality work.

The opportunity for TBL groups to become self-managed teams results from a combination of two conditions. First, the groups must have complete freedom to manage their own interactions. The Second, every activity and assignment must be explicitly designed and managed to provide immediate performance feedback. Both conditions are essential and, if either is violated, the team development process will be slowed and, if the violations persist, may be completely derailed. For example, if the instructor prescribes how the groups are to go about their work, then the feedback is about the instructor’s instructions not about the groups’ choices. Further, without feedback on the quality of their choices, groups have no way to evaluate the effectiveness of the process they used to make them.

However, when groups do have immediate and ongoing feedback, members automatically (i.e., with no prompting whatsoever from the instructor) and the opportunity for immediate and ongoing feedback, members consistently engage in evaluating and improving their processes while they are engaged in completing their assigned tasks (Sweet & Sweet, 2008). With appropriate tasks, a number of positive changes occur within the groups. Over time, as the groups develop into teams:
1. They become more effective at using their members’ intellectual resources (at 25-30 hours—Watson, Michaelsen & Sharp, 1991).
2. They are better able to cope with and take advantage of the resources potentially available in diverse groups (at around 30 hours—Watson, Kumar & Michaelsen, 1993).
3. They utilize different strategies for resolving conflict in reaching decisions. Early on they dominant strategy is “Compromise”—everyone is willing to lose a little just so they can reach agreement. Later on (25+ hours), compromise is completely off the table and the groups use “Problem Solving” (Birmingham & Michaelsen, 1999).
4. Team members’ experience increases in their emotional intelligence (Borges, Kirkham, Deardorff & Moore, 2012) and interpersonal/team-management skills (Opatrny, Michaelsen & McCord, in press).

While the ultimate objective of the group work in TBL, CL and PBL is essentially the same (i.e., motivating students to engage in conversations about the content in ways that improve learning) the strategies for achieving that outcome are very different. Further, since the creation of self-managed teams is not central to the success of either CL or PBL, both approaches can (and often do) use strategies that are effective in promoting content related discussions but which also inhibit the team-development process. For example, with both CL and TBL instructors are typically are actively involved in managing the processes that the groups use as they engage in their work. With PBL, the involvement is often very direct. During most group meetings a trained facilitator is both physically present and expected to intervene when direction is needed to keep the groups effective and on task. With CL, the instructor’s influence is often less direct because he or she is typically working with multiple groups. However, many of the most widely used CL practices would not be a good fit for TBL for one of two reasons. In some cases, the lack of fit results from the fact that the practices interfere with the groups’ ability to manage their own processes. These would include practices such as assigning individual member roles, limiting resources, and using structured interactions such as think-pair-share and jigsaw. With
other CL activities, the lack of fit with TBL would be more of a time and/or effectiveness issue. Because every group activity in TBL (i.e., tRATs and 4-S applications) is specifically designed to promote both content learning and team development, activities that focus solely on promoting open communications (e.g. community and/or team building activities, post-activity group process discussions etc.) not only aren’t needed, they are far less effective than providing real-time performance feedback while the groups/teams are actually engaged in doing their actual content-related “work” (e.g. see– Edmondson, Bohmer & Pisano, 2001).

**Fundamental Principles for Designing and Facilitating Team-Based Learning Courses**

Six fundamental principles guide every aspect of designing and facilitating a TBL course. These principles are: 1) Plan backwards and execute forwards, 2) Use mutually reinforcing activities in a specific sequence, 3) Use a majority of class time for higher-level thinking application activities, 4) Use activities and assignments so that they both promote learning and build team relationships, 5) Provide frequent and immediate feedback on individual and team performance and, 6) Employ a grading/reward system that promotes both individual and team accountability for doing high quality work.

**Plan Backwards and Execute Forwards**

In traditional lecture based courses, teachers typically begin planning a course by identifying what content they need to “cover.” In contrast, the design of a TBL course requires one to use “backward design” (Wiggins & McTighe, 1998) to get real clarity on what “mastery” looks like in one’s course. To get this clarity, instructors engage the design process by asking themselves four questions (See Parmelee, Hudes, Cook & Michaelsen, 2013).

The first question is, “What do I want my students to be able to do with the material in this unit?” and guides the development of behavioral (not just knowledge) objectives.

The second question is, “How can I assess whether or not students can do what I want them to be able to do?” and guides the design of activities that require students do something that is as close as possible to the desired behavioral outcome(s) specified in question one above.

The third question is, “What will students need to know in order to do what I want them to do?” and guides the selection of the content that students will be expected to master prior to the first class meeting of the unit.

The final question is, “How can I assess whether students are ready to engage in the activities in which they will demonstrate their abilities to do what I want them to be able to do?” and guides the assessment of their pre-class preparation.

The execution of TBL units follows exactly the reverse order and, although the processes are very different, the intent of the sequence is similar to traditional teaching. In both cases the objective is ensuring that students are familiar with a set of concepts. With TBL this is done through individual pre-class study and using a modest proportion of class time for the Readiness Assurance Process and focused corrective instruction (described above—see Michaelsen et. al, 2004). However, the majority of class time for team activities focuses on enhancing and/or assessing students’ ability to use course concepts. By contrast, with traditional teaching, the majority of class time (if not all of it) is used for transmitting course concepts from the instructor to students. Most of the application/critical thinking work is done outside of class either by individuals or by groups that typically divide up the work required to produce a deliverable that is submitted as a graded course assignment.

**Use Mutually Reinforcing Activities in a Specific Sequence**

In contrast to the traditional model in which a teacher’s role is primarily to select and dispense content, the TBL instructor spends much more time organizing content and facilitating the students’ experience of helping each other learn the content and how it can be used to solve problems. The sequence of the TBL Readiness Assurance process ensures that students get several chances to engage with content and judge and enhance their own level of understanding.

Using backwards design enables instructors to identify what content students can and should learn on their own during pre-class preparation. Many instructors have found that some form of “curating” of the content can be very helpful in this step: for example, by creating reading guides to help students focus their attention on the most important aspects of the readings. Starting each unit with an iRAT gives students an initial chance to judge their level of understanding of the material and, importantly, ensures that team members are accountable for their own individual preparation. Next, during the tRAT, the immediate feedback from their peers and the IF-AT answer sheets provides both an additional incentive for student preparation and the opportunity to clarify their understandings of course material. Further, the immediate feedback from the IF-AT answer sheets enhances team development because, with each scratch, teams learn how effectively they are using members’ input in reaching their decisions. This immediate performance feedback both enables teams to become more effective and enhances members to acquire teamwork skills. Further, the tRAT and the appeals enable the teacher to identify and correct misunderstandings and/or gaps in students’ knowledge when there is
ample time for corrective instruction. Finally, with well-designed applications activities, students learn why the course content is of value and are even more motivated to go through the cycle again with the next set of concepts.

By beginning each unit with the Readiness Assurance Process, teachers can count on having teams whose members are intellectually and socially prepared to work on challenging problems that support the development of higher level thinking skills. By contrast, in a traditionally taught course that primarily involves knowledge dissemination, the teacher has very little information about the level of his or her students’ content understanding and little or no opportunity to correct misconceptions. Further, he or she has little or no ability to ensure that students will be effective in working together should he or she decide to use a group assignment.

**Use the Majority of Class Time for Applications/Critical Thinking**

TBL is not about covering content. From a student standpoint, the overall “feel” of the class must be that the class is about learning to do something as opposed to learning some facts so that they can pass a test. With TBL, you are making an implicit bargain with students that, “If you will do the pre-class preparation, I’ll make sure that you are rewarded by having the opportunity to see why the ideas are important to you.” The real payoff for students comes from opportunities to practice using the content on well-designed (i.e., “4-S”) assignments. That is how you pay them for their effort to prepare for the RAP. In fact, having challenging 4-S applications is ultimately the single most important aspect of successfully implementing TBL. If students are able to see why the material is important, everything pretty much falls into place.

By contrast, in traditional courses the primary in-class activity is the teacher dispensing information. As a result, application-focused activities, if there are any, almost always take place outside of class. Further, the assignments typically require either individuals or groups to create a lengthy document and/or a presentation and, with few exceptions, the feedback on their work is delayed to the point that students are more concerned about the grade they receive than the learning that the assignment was intended to produce.

**Use Assignments that Both Build Teams and Promote Learning**

The nature of the assignments largely determines the effectiveness of learning groups in any setting. However, well-designed assignments are particularly important in TBL because the entire approach hinges on being able to develop groups into self-managed teams. Fortunately, assignments that require a high level of team interaction promote both learning and team development (e.g. see Michaelsen et al., 2004). In most cases, team assignments will generate a high level of interaction if they: 1) require teams to use course concepts to make decisions that involve a complex set of issues and, 2) enable teams to report their decisions in a simple form. When assignments emphasize making decisions, the sensible approach is to complete the task by engaging each other in a give-and-take content-related discussion (e.g. Roberson & Franchini, 2013).

By contrast, assignments with complex output such as a lengthy document and/or a group presentation that are often used in traditional courses can completely undermine an attempt to implement TBL. That is because, in a group project outside of class, instead of promoting interaction and team development, the logical strategy for completing the assignment is to divide up the work among team members. Unfortunately, the outcome is that members are forced to either rely on one or two members to do most of the work or assign segments to individual members who work pretty much alone on their part of the overall project. With either approach, instead of building teams, assignments of this type are likely to create negative attitudes about group work because members are likely to feel that they have to do more than their fair share of the work or be at risk of getting a poor grade if anyone fails to do their part.

**Provide Frequent and Immediate Feedback on Individual and Team Performance**

Immediate feedback is a primary instructional lever in TBL for two very different reasons. First, feedback is essential to content learning and retention—a notion that not only makes intuitive sense but is also well documented in educational research literature (e.g., Bruning, Schraw & Ronning, 1994; Kulik & Kulik, 1998; Hattie & Timperlie, 2007). Second, immediate feedback has tremendous positive impact on group development (for a review, see Birmingham & McCord, 2004). Further, immediate feedback is built into TBL’s standard practices. The use of IF-AT answer sheets provides immediate feedback on both team members’ understanding and teams’ readiness for dealing with application problems. Similarly, simultaneously reported decisions on application-focused assignments provide immediate feedback to both individuals and teams. That is because: 1) teams’ choices are based on discussions that have just taken place and, 2) are open to challenges from both their peers and the instructor during the inter-team discussions.

With traditional courses, feedback on content understanding typically comes from mid-term and final exams and feedback on content applications is usually from the instructor after he/she has had the chance to evaluate students’ work. As a result, the feedback is less effective than in TBL because it is both less frequent and is often delayed to the point that there is little or no opportunity for corrective instruction. As a result, feedback is almost exclusively summative in nature in traditional instruction.


**Employ a Grading/Reward System that Promotes Individual and Team Accountability**

Providing immediate feedback on the level of students’ understanding is one key to holding individuals and teams accountable for doing high quality work. However, for many students, providing immediate feedback is not a sufficient source of motivation to ensure that they will do the work needed to master and apply course concepts. For many students, another key is using a reward system that links students’ grades to each of the activities that are essential for their own learning and to the success of their team. Thus, an effective grading system for TBL must meet two criteria (e.g. see Michaelsen et al., 2004). One is that the grading system must include three components: 1) Individual Performance, 2) Team Performance and, 3) a Peer Assessment of individual members’ contributions to their team. The other is that each of the three components must “count” enough so that students care about their score.

The grading system in most traditional courses is quite different. The only thing that typically counts is individual performance unless the instructor assigns students to do a group project. In this case, he or she is also likely to include group performance and possibly some form of peer assessment as additional components in the grading system. Unfortunately, however, even if the groups turn in a satisfactory “product” the resulting grades are often a source of what is commonly known as the “free-rider” problem. In part the reason is that some, if not the majority of, students will honestly believe that they have done more than their fair share of the work. Further, even if they believe they did more than their fair share, students are often reluctant to give low grades to the group members who failed to do their part.

**Concluding Thoughts about TBL**

Probably the two most unique aspects of Team-Based Learning are that: 1) it is highly dependent on being able to develop groups into self-managed and effective teams and, 2) its foundational practices enable very nearly 100% of learning groups to develop into learning teams that are both capable of self-management and highly effective. Over the past 30 years, Michaelsen has created and worked with 1,800 teams in both undergraduate and graduate classes, and in class sizes ranging from 7 to 240 students. During this time, only two teams have required any form of outside intervention. Further, neither intervention lasted more than five minutes and both teams responded in a positive way and ended up being successful. The clearest evidence for the effectiveness of the teams comes from comparing the scores for the iRATs and tRATs. Based on the available records (i.e., since 1986), the cumulative iRAT score of over 99.9+ of the teams in Michaelsen’s TBL courses has been higher than the cumulative iRAT score of its very highest-scoring member (1,201 of 1,202 teams). These results are both profound and represent an outcome the clarity of which is rarely, if ever, found anywhere in the social sciences.

There are two implications to these rather remarkable outcomes. One is that, in combination, the four fundamental TBL practices are overwhelmingly effective in building effective and self-managed teams. The other is that these fundamental practices are truly fundamental. If the four key TBL practices are systematically and effectively implemented, groups will develop into effective self-managed teams; if not, the team-development process will be both slower and less reliable.

Thus, for the reasons outlined above in the discussion of TBL principles, it is not only possible, it is essential to measure one’s TBL implementation against the set of fundamental TBL practices described here (see Haidet, Levine, Parmelee, Crow, Kennedy, Kelly, Perkowski, Michaelsen, & Richards, 2012). Far too many faculty fail to realize that with effectively using group work requires more than simply giving group assignments. In fact, although the problem probably exists with at least some CL and PBL users as well, most experienced TBL practitioners have encountered faculty colleagues who are adamant that TBL doesn’t work because they had a bad experience with what they thought was TBL in fact when they had failed to implement even one of TBL’s fundamental practices.

On the other hand, faculty who deliberately and carefully implement the combination of: 1) strategically forming permanent teams, 2) employing the Readiness Assurance Process to familiarize students with course content, 3) using in-class 4-5 assignments to develop students’ critical thinking skills and, 4) holding peers accountable to each other with a peer assessment and feedback system can be confident that the outcomes will be positive in a wide variety of ways (See Haidet et al., 2013). More importantly, TBL creates classroom experiences that are much more enjoyable and productive for both instructors and their students because the students become partners in the learning process (e.g. see Sibley & Ostafichuk, 2013).

**Concluding thoughts about the relationship between TBL, CL and PBL**

Team Based Learning, Problem Based Learning, and Cooperative Learning are all form of small group learning and have much in common. All three approaches foster active engagement of students in the learning process by having students work together in purposefully-formed small groups. Further, unlike the group work (typically projects that require producing a paper or presentation) used in conjunction with traditional lecture-based courses, groups in TBL, CL and PBL classes do their work during class time.

The ultimate objective of the group work in TBL, CL and PBL is essentially the same, i.e., motivating students to engage in conversations about the content in ways that improve learning. Although the specific
strategies for achieving that outcome are different, the focus of class activity in all three approaches involves engaging students in challenging problem situations that require critical and creative thinking and interaction with other members of their group. All three approaches also emphasize the importance of holding students accountable by using some form of a summative assessment over the concepts related to the group work. Finally, all three approaches have a solid base of evidence that documents their effectiveness in achieving a wide variety of valuable educational outcomes (see articles by Albanese and Dast, Haidet et al. The biggest overall difference between TBL and CL and PBL is that TBL is a very clearly defined set of practices and principles (above—also, see Burgiss, McGregor & Mellis, 2014) while CL and PBL are much larger “tents” under which a much wider range of practices for using group work are housed. Major comparisons and contrasts among TBL, PBL, and CL are discussed above and many are summarized in Table 1, using the following four dimensions: group formation and size, ensuring concept familiarity, in-class assignments, and peer assessment.

There are a number of approaches in both CL and PBL and with both CL and PBL each of the approaches have certain points in common, but many differences. The CL approaches most frequently used in higher education are the learning together (Johnson, Johnson, and Smith), structural (Kagan), group investigation (Sharan and Sharan), and eclectic (Millis). The approaches that represent the ends of the PBL continuum are 7-Step and Open-ended (Baud, 1985). For additional comparisons and contrasts between TBL and these subsets of CL and PBL, we suggest examining the points listed in Table 1 of the article by Davidson and Major in this volume in relation to the fundamental practices and principles of TBL (above).

Conclusion

In conclusion, TBL, CL, and PBL all have a common goal of optimizing student learning, helping students develop higher order thinking skills, and improving learning process and products. Each of these methods has strong advocates. They also each have a strong body of evidence to support them. These methods all require engaged students, group work, and observable products of learning. They each go about getting there in different ways, with more or less emphasis on the structures and sequencing of instructional activities. What they all offer higher education instructors, however, is tried and true methods that engage students in learning and in turn improve educational outcomes.

References


Davidson, N. & Major, C., Boundary Crossings: Collaborative Learning, Cooperative Learning, and Problem-Based Learning.


