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Chapter 11- Team-Based Learning Brings Academic Rigor, Collaboration, and Community to Online Learning

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11.

TEAM-BASED LEARNING BRINGS ACADEMIC RIGOR, COLLABORATION, AND COMMUNITY TO ONLINE LEARNING

Elizabeth Winter, Michele C. Clark, and Christopher Burns

Author Note

The authors are all experienced TBL practitioners and Certified TBL consultants who come from different disciplines with diverse learners and learning environments.

“Online lectures suck—nobody learns anything.”

In early 2020, instructors were faced with a critical and immediate need to move education online in the face of the COVID-19 pandemic. The decision to discontinue face-to-face classes as a protection from the COVID-19 virus presented several questions and challenges, including the need to quickly develop online classes without adequate time to consider the effectiveness of different strategies. While online learning provides accessible and safe educational opportunities for students sheltering in place as a protection against the COVID-19 pandemic, faculty may question if online education provides the academic rigor, needed competencies, and student learning outcomes they hoped for in traditional campus classes.

While presenting lectures online was one popular strategy used to quickly transition courses, the combination of passive learning and the online environment lacks the demonstrated benefits of active learning involving student engagement with the content and collaborative learning among learners and their instructors (Kamei et al., 2012). Strategies to promote student engagement are crucial to promote collaboration and innovative interactions necessary for deep learning. Therefore, simply moving lectures online is likely to result in little meaningful learner–learner or learner–teacher interaction, and both may disengage.

This chapter describes Team-Based Learning, a resilient, evidence-supported instructional method (Haidet et al., 2014; Sisk, 2011) that brings engagement and rigor to online learning while promoting student resilience. The hallmarks of TBL are (a) active learning; (b) both acquisition and application of knowledge and concept; and (c) the use of small, diverse teams that promote effective group work and cohesion.

Recent work describes the growth and emerging effectiveness of fully online methods in education and interprofessional education (Abrami et al., 2006; Kuo et al., 2016; Shaw-Battista et al., 2015; Spagnoletti et al., 2008). There is a variety of online, ready to use tools, such as Khan Academy (<https://www.khanacademy.org/>); however, a major drawback of many existing methods is the individual basis of learning. Educators have clearly recognized the value of teaming and group projects in education, both within and across disciplines (Institute of Medicine, 2015; Mitchell et al., 2012). TBL provides an evidence-based online learning opportunity while also socializing learners into the desired behaviors of teaming to help prepare them for the work environment. Learners are evaluated both as individuals and in their teams, so the value instructors place on collaboration is evident because it is assessed. It almost goes without saying that the well-being benefits of social connectedness that are embedded in TBL instructional design and delivery are even more salient in times of crisis.

During 2020, educators faced a critical and immediate need to move teaching online in the face of the COVID-19 pandemic. Rapid elimination of in-person classes required instructors to quickly develop and deliver instruction online, often using unproven methods with uncertain effectiveness. While online sessions allow for safe educational opportunities for learners sheltering in place, simply moving traditional lectures online—often using the ubiquitous narrated PowerPoint—has questionable benefits. Educators teaching synchronously report anecdotally that looking at a computer screen of blank boxes (with many learners remaining off-camera), removes the feedback they are accustomed to in colocated teaching; the ability to “read the room” and gauge engagement or understanding is severely diminished. In online learning, instructors may ask themselves, How do I know they are engaged? How do I know everyone in a group or team activity is doing a fair share of the work? How do I know they are learning? Or, even more importantly, How do I know they are able to apply what we are teaching?

Since the start of the COVID-19 pandemic, college students have indicated feeling greater stress. The isolation faced by many learners is a critical concern given quarantining, social distancing, and the known negative impact of the actual and perceived lack of meaningful human contact up to and including increased mortality risk (Holt-Lunstad et al., 2015). In one study on the impact of the pandemic on college students (Son et al., 2020), 71% of students surveyed reported increased stress, anxiety, and depressive thoughts, while 86% reported sleep disruption. The majority of these students also reported decreased social interactions, difficulty concentrating, and worries about academic performance. The need for resilient pedagogies that both support students and support their learning could not be clearer.

What is Resilience?

Resilience is not a quality or attribute magically present in some and not in others. Rather, resilience is the result of protective and privileged factors that, in general terms, reduce the probability of negative outcomes in given circumstances (Masten et al., 2009). While educators may not have a great deal of impact on the

individual protective factors that learners bring with them, instructors can impact the learning environment by building social support and social connectedness into their teaching, which in turn helps to support student well-being (Martino et al., 2017). Social support has long been understood to reduce the impact of severe stress (see the work of King and colleagues, 1998, with Vietnam veterans) and students have reported feeling greater happiness and well-being on days when they interacted more with classmates (Sandstrom & Dunn, 2014).

Overview of Team-Based Learning

The four essential principles of TBL in any environment are: (a) appropriately formed teams that ensure learner resources are equally distributed among the teams, (b) learner accountability for the work, (c) team assignments that promote both learning and team development, and (d) frequent and immediate feedback for learners (Michaelsen et al., 2002; Rajalingam et al., 2018).

Team-Based Learning has been introduced into the online environment to ensure active, collaborative, small-group learning experiences in the context of large groups working virtually (Clark et al., 2017; Clark et al., 2018; Michaelsen et al., 2004). Synchronous online TBL mimics the face-to-face environment, while asynchronous online TBL adds flexibility for those who are not able to meet in real time; combinations of both synchronous and asynchronous elements can be used in the same course.

Four Essential Principles

As proposed by Michaelsen et al. (2004), four essential principles of TBL are necessary for learners to evolve into engaged and cohesive learning teams. Each of the four principles has a unique contribution to the learning experience and is crucial in any learning environment using TBL. Each principle provides particular challenges for the instructor in an online environment (Clark et al., 2018; Dorneich et al., 2010).

Principle 1: Teams Must be Properly Formed and Managed

Teams must be diverse and instructor-selected. Forming active and successful TBL teams requires distributing students among teams in such a way as to maximize diverse perspectives and resources in each team. To ensure diversity and to reduce the probability of subgroups arising, the instructor selects teams. Where possible, before the course begins, instructors identify important characteristics relevant to the course topic before selecting teams, such as choice of major, previous exposure to the course topic, and their level of interest in the topic. The instructor may use a survey to explore relevant characteristics, which can be delivered to the learners before class as a link in a welcome email message. The information gathered then assists the instructor in distributing the intellectual and experiential resources equally among teams. Where prior determination of

relevant characteristics is either not practical or not permitted, assigning students to teams at random can distribute individual resources adequately. It is recommended that all factors used and the method of selection be completely transparent to students (Sibley & Parmelee, 2008).

While diversity based on characteristics such as cultural background, race and ethnicity, nationality, age, or gender may bring great richness and difference of perspective to teams, selection based on such demographic characteristics should be avoided, since it can lead to marginalization and stigmatization of minority team members. The marginalization or silencing of students of color and women is not unique to TBL; it is well documented in many instructional settings, and being female and a racial or ethnic minority has been described as a “double whammy” (Ancis et al., 2000; Julé, 2004). Distributing racial minority students across teams may only serve to isolate and marginalize them further. Macke and colleagues (2019) report that in a predominantly White institution using TBL, Black social work students were rated less highly by their peers, despite having comparable grades and academic performance in coursework. (Wayland et al., 2015). Wayland and colleagues (2015) therefore recommend avoiding placing a token woman or person of color in a team. It is important for instructors to be aware of the implications of racial and gender concerns not only for team selection, but also for team management and appropriate instructor facilitation of team activities.

As will be further explored in the sections on implementation, the frequent presence of instructors in online TBL provide natural opportunities to observe team interactions carefully and discreetly moderate the impact of implicit bias by prompting students who appear to be marginalized in their teams to speak up, and by prompting team members to listen to all voices. When a team is in the initial stages of forming, any marginalization and exclusion interfere with team cohesion, a crucial ingredient for positive performance over time (Mathieu et al., 2015) as well as harming the experience of any student so marginalized (Winstead, 2016).

Team size is also important and teams of five to seven are generally recommended in TBL (Restad, 2012). In the online environment, teams of four may be preferred in order to promote more effective team cohesion and collaboration. Teams should be permanent, when possible, for the life of the course in order to promote meaningful interactions and build relationships among teammates. However, TBL can still be effective using ad hoc teams in situations where the group of learners changes frequently (such as professional development workshops). For members of a group to develop cohesion and transform into a high-performing team, common tasks and time is required (Eys et al., 2015; Michaelsen & Sweet, 2008). Team cohesion, as defined by Michalisin et al. (2004, p. 1109), is “the degree to which members are attracted to their team and desire to remain in it.” Team cohesion has been an important part of the education literature as cohesive student teams have greater performance outcomes as “relatively little energy is required to maintain the group and therefore the group can direct most of its energy towards goal accomplishment.” Working together throughout the semester helps learners to develop trust in other members and identify the resources each member brings to the team when participating in team assignments. As teams begin to share experiences through the group assignments, successful teams remain united in common tasks and a common purpose, as well as satisfying

some of the need for belonging (Eys et al., 2015). Many TBL instructors ask teams to develop contracts early in the course, detailing their expectations for individuals and for their teams to guide their work together.

Principle 2: Learners are Accountable for Individual and Team Work

Accountability in an online or face-to-face environment is the individual learner's obligation to account for learning responsibilities and the disclosure of that learning (Prichard, 2017). However, when collaborative team products are required for class assignments, individual or peer accountability to the team is crucial. To foster active and engaged participation in a team activity, there are several teaching strategies. For example, learners need to observe and evaluate other teams' work in similar team assignments (Sonntag & Zizzo, 2019), allowing them to measure their work compared to other teams. It is a real-time look at the team's strength of preparation and problem-solving. Team resources and roles necessary for team success are also critically assessed (Roy, 2019).

Groups become teams when team members develop trust and feel free to voice opinions and work with classmates to solve complex problems. Trust requires individual members to be accountable for their contributions, which requires being prepared to participate in class assignments. Active small-team learning developed from trust is essential in supporting learning and assisting learners in understanding and retaining information (Stein et al., 2016). Active small teams engage in activities, so learners learn from each other, and learners have the opportunity to explain concepts and ideas to their fellow team members in their own words, often making the material more understandable (Michaelsen et al., 2004).

For active team learning in TBL, there are three areas of accountability: individual preclass preparation, contributions to the team's problem-solving activities, and participation in "high-quality team performance" (Michaelsen & Sweet, 2008). Therefore, the TBL activities embedded in the course structure promote accountability. For example, preclass learning is crucial for all online TBL team activities. A team test (see below for details on the team readiness assurance test or "tRAT") has grade and social incentives to come to class prepared, and peer evaluations, completed by team members, have consequences on individual grades. The peer evaluation requires learners to evaluate the performance of team members, and for inactive team members there are consequences of losing grade points. Peer evaluation is also an incentive for team members to be more conscious of their performance (Stein et al., 2016).

Principle 3: Assignments Must be Properly Constructed to Promote Learning and Team Development

The instructional sequence in TBL is a carefully scaffolded, incremental process, which follows the same design in any learning environment. The instructional process for TBL learners starts with the preparation phase, in which students individually (usually, but not necessarily) complete readings that provide the

content and conceptual knowledge that will prepare them to address problems that apply content and concept. Preparation is followed by the readiness assurance process (RAP) phase, in which learners are tested individually and then again in their teams on content and concepts. Teams then address more complex assignments, which require them to apply the content and concepts that they have rehearsed twice in the RAP phase.

Team-Based Learning practitioners follow the principles of backwards design (Wiggins & McTighe, 2005), starting with the guiding question, “What do you want students to be able to do at the end of the module?”. Instructional materials are then designed in the opposite order from which students meet them. Learning objectives are designed based on the answer to the guiding question and the instructor decides what evidence will demonstrate that the learning objectives have been met. Application problems are designed next; applications require learners to work together to apply content knowledge and concepts to solve messy, realistic problems while paying close attention to the structural requirements for effective TBL applications. Application activities need to be complex enough to engage all team members and not be either easily answered by one person, put into a search engine to find an answer (not “googleable”), or divided into several discrete tasks completed individually. Writing effective application activities is probably the most challenging part of the model.

Next, a test, typically using multiple choice questions, is developed for the readiness assurance process (RAP). The RAP tests and recall of the knowledge and concepts from the preparation phase materials that are essential for successful completion of the application activities. It is worth noting that students answer the RAP questions before interacting with the instructor.

Finally, preparation materials are developed in whatever format effectively conveys the content and concepts required for solving the application problems, including readings, video clips, voice-over PowerPoint recorded lectures, online workbooks, and the like. In TBL, preparation readings are typically shorter and more targeted, and aligned clearly to the learning objectives. Content that is not directly relevant to learning objectives is excised from preparation materials and attention is paid to the time required for students to complete the preparation materials. Some practitioners develop or select their preparation materials before writing the test for the RAP (Koles et al., 2016). In any case, it is always useful to circle back and make sure that the instructional sequence is logically connected and aligned from beginning to end.

Principle 4: Students Must Receive Frequent and Immediate Performance Feedback

In an online or face-to-face environment, performance feedback is crucial for students to understand the learning process related to the course (Rozell et al., 2017); feedback is critical for content learning and retention (Michaelsen et al., 2004). Team-Based Learning adds another layer in the learning experience that is

particularly powerful. Teams are an essential factor in the learning experience, and teams' feedback substantially impacts team development and cohesion (Goh et al., 2020). However, for teams to understand their performance concerning the required assignment standards, feedback must be immediate and frequent. If other teams' performance can be deidentified and provided to learners, so as to adhere to educational privacy requirements, teams can redirect their efforts when they see that their performance is not matching that of other teams.

Two phases of the TBL process, the RAP and applications phases, provide immediate and frequent feedback to improve collaborative learning. Students complete the individual readiness assurance test (the iRAT) at the beginning of each module without immediate feedback and they are not aware of their scores. In the team portion of the test (tRAT), teams receive immediate feedback of which answers are correct, and continue to choose answers until they select the correct response; each incorrect response reduces the score received for the item. The final tRAT score motivates teams to prepare for both the iRAT and tRAT, and their scores alert them on how well they understand the module concepts.

Application exercises (also typically constructed using a multiple-choice format) require teams to solve challenging problems that involve complex decisions. The application exercise is fashioned around a complicated case or problem in which the team is required to choose one answer, which could be similar to other provided options. In synchronous online TBL, teams are usually asked to give their rationale orally in real time. In asynchronous online TBL, reviewing other teams' written rationales for their responses provides valuable information for each team to consider, supporting deeper understanding of the particular case or problem. Teams can go on to select (from all teams' rationales) the rationale they believe best supports the answer selected. Written rationales also allow the instructor to give written and verbal feedback to teams regarding incorrect or correct approaches. Using both types of feedback is a more effective strategy than providing only one (Medina et al., 2013). While providing timely feedback on the application exercises is more challenging in an asynchronous online environment, it is done in a very limited time frame and is crucial for deeper learning.

The last area of frequent, if not immediate, feedback is that of peer evaluation, which needs to be done with greater frequency online than in colocated environments. Maximization of the many benefits of TBL requires high-functioning teams. Many learners enjoy working within a team and improving their teamwork and individual skills. Some come to TBL with experiences of success as individual learners and with prior negative experiences with team projects, often because there were no consequences when someone failed to do their share of the work, leading to additional unrecognized and unrewarded work on the part of those who picked up the slack to complete the project. Peer feedback and evaluation mechanisms in TBL enable learners to hold each other accountable for promoting team learning and success, which helps to mitigate resentment and frustration within teams (Lane, 2012).

While there are many ways to implement peer evaluation into courses, many instructors use a combination of Likert-scaled and open-ended items, which requires students to rate their team members on such areas as preparedness, contribution to discussion (too little to too much), respectful communication, and the like. One method to support positive change over the course is to give credit for completing peer evaluations and use all but the final peer evaluation as formative, with a grade based only on the final peer evaluation. It is most helpful for an instructor to consider their particular learners, learning environment and culture, and learning goals to guide them in determining the details on how they will implement peer evaluation in their setting.

Before embarking on peer evaluation, instructors may need to address two concerns. The first is any negative perceptions about peer evaluation that students may have (Levine et al., 2007; Parmelee et al., 2009), and the second is that students may need to learn how to give and receive appropriate feedback (Michaelsen & Schultheiss, 1989). Instruction, rehearsal, moderation, and critiquing examples all function to scaffold giving and receiving effective peer evaluation and can be done during orientation to TBL, as a stand-alone session, or periodically, depending on the learning situation and goals. Although time and instructor effort are required, it helps develop a critical life skill learners will use throughout their future careers.

In addition to individual peer evaluations, there is evidence supporting the value of team-level feedback rather than individual performance. Team-level feedback focuses on the development of teamwork skills and makes an explicit connection between improving teamwork skills and improved performance. Learners may find evaluating the team as a whole less intimidating, especially as a preparatory step toward peer-to-peer feedback. Indeed, using both team and peer feedback is supported by a recent study that reported learner perceptions of both activities. Learners reported team feedback to be more helpful in developing team cohesion and in understanding characteristics of well-functioning teams, while peer-to-peer evaluations were more helpful for improving their own individual performance in their teams (Madson & Burns, 2020).

Peer evaluation promotes socialization into professional teams and improves team performance. Competence in giving and receiving feedback is becoming more important as learners and workers move among different groups in growing online professional communities with little to no time to develop face-to-face relationships.

The Phases of TBL

The four principles of TBL are implemented by means of a repeating three-step learning cycle that includes: (a) preparation, (b) readiness assurance quizzes, and (c) application-focused activities (Sweet & Michaelsen, 2012). As shown in Figure 1, the structure of modules remains consistent throughout the course, and the three-step learning cycle is repeated in every module (Clark et al., 2018). Fidelity to the TBL model, by

adherence to the four TBL principles and the three-step TBL process outlined below (Sweet & Michaelsen, 2012), is crucial for learner collaboration and active participation in learning.

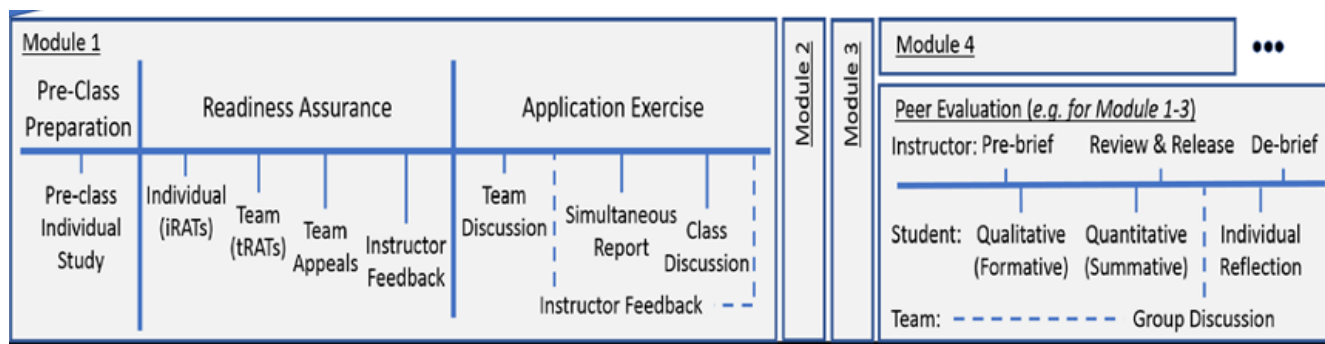


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Step 1: The Preparation Phase

Faculty members may be concerned that online learners do not understand the importance of learning material in the time allotted for completion of the module. Learners in TBL are required to be ready for class by completing assignments as preparation for an individual quiz to ensure accountability and adequate preparation for applying content and concepts to complex problems at higher levels of Bloom's revised taxonomy later in the TBL instructional sequence (Anderson & Krathwohl, 2001). Preparation assignments may be completed individually or with study partners, using any format that students can access independently, such as text, study guides, videos, and narrated PowerPoints. In a comparison of the use of traditional lecture and TBL, DeJongh and colleagues (2018) reported that students in TBL courses were more likely to spend more time preparing for class than students in the traditional lectures.

Step 2a: Readiness Assurance Process

The readiness assurance process (RAP) involves retrieval of critical concepts and content that lay the foundation for applications. There are two parts to the RAP. First, an online quiz, called the readiness assurance test (RAT), is taken individually (iRAT). Next, the same quiz is retaken with the individual's assigned team members (tRAT); items are discussed together, and item responses selected by the team (Clark et al., 2018; Sweet & Michaelsen, 2012; Michaelsen et al., 2014). As noted above, immediate feedback for the team RAT ensures that teams proceed to the next phase of learning with the knowledge required to be successful.

Assuring academic integrity in the online environment is more challenging than in colocated classrooms, and instructors take various approaches. Since RATs are formative in nature and the objective is for students to know the materials, some instructors reduce the grade weight of RAT scores, others make RAT questions

more challenging, or put tighter time limits on the iRAT and tRAT. Instructors often compare iRAT scores with the percentage of first-time correct choices in the tRAT, with the expectation that team scores will outperform individual scores.

Step 2b: Appeals

The appeals process is also part of the RAP. Students can challenge the question or the “correct” answer. Appeals are traditionally done by requiring a team to submit a rationale within a designated time frame, with evidence either that the correct answer is inaccurate, a suggested alternate wording for the question, or making a case that the preparation materials did not adequately prepare students to respond to the question. Traditionally, appeals may only be made by teams (not individuals) and only the team making an appeal benefits from receiving grade credit if they prevail in making their case. Some instructors adopt a less-formal appeals process in synchronous classes when debriefing the RAT. The appeals process supports academic rigor since it rewards engagement and critical thinking about RAT questions and team cohesion in preparing the appeal. It also provides an excellent opportunity for instructors to model good leadership skills by explicitly acknowledging that instructors may make mistakes, are open to challenge, and that successful challenges are rewarded.

Step 3: Application-Focused Exercises

After the completion of the RAP, which ensures that learners understand the basic concepts and content, teams are ready to apply them in the next phase by working on more complex problems that promote mastery of the material and which mimic authentic, real-world problems (Hassan et al., 2018; Sweet & Michaelsen, 2012). The construction of challenging and complex TBL applications is both demanding and satisfying and allows instructors to leverage their expert knowledge and skills.

There are four key features that contribute to successful applications, which are collectively referred to as the 4S's. Problems must be *significant*; with *specific* response choices; teams work on the same problems; and teams report responses *simultaneously*.

Significant Problems

As noted above, applications should be sufficiently complex and realistic, or “messy,” to need input from the entire team and not be something that can either be quickly looked up or solved by an individual. The purpose of an application activity is to engage all team members in applying concepts and information from preparation materials given to a problem that is both relevant and significant to the learner. Problems lacking significance for learners are unlikely to stimulate engagement and enthusiasm.

Specific Choices

Multiple-choice answers provide the specific choices. It is also an ideal opportunity to draft possible answers (distractors), which represent frequent errors and misunderstandings. Disagreements are more likely to surface within and across teams and can be fully aired. Specific choices also track the discussion and help avoid open-ended conversations that never quite meet the requirements of the learning objective. Some faculty use interactive “gallery-walks” where students create work to be discussed and critiqued by their colleagues. Gallery walk outputs may include narrative or direct speech responses, designs, flowcharts, plans, or other diagrams, depending on the discipline and learning objective. With minimal adaptation, gallery walks can be adapted to satisfy all 4S requirements in the online environment, using collaborative learning technologies (Winter & McCarter, 2020).

Same Problem

Teams work on the same problems, coming to conclusions independently and then, after reporting out, can make their case for their chosen response and consider alternate responses. Working on the same problem maintains the interest of all teams in the inter-team discussion phase and ensures everyone covers the same learning points.

Simultaneous Report

Simultaneous response reporting helps to prevent teams from reconsidering or second-guessing their decisions, which is more likely to occur if teams report decisions sequentially. Reporting is followed by the instructor eliciting teams’ rationales for their selection and facilitating debate among teams by asking thought-deepening questions, drawing out all relevant perspectives, and concluding by ensuring that teams understand the primary learning points. In the asynchronous environment, a modified gallery walk process can be used, where the instructor collects responses and posts them all at the same time, so that teams can view and comment on them in a designated time period.

Implementation

Instructor Skill Development and Resources

It unquestionably takes an investment of time and energy to learn the TBL method and then prepare for online instruction. The gateway into the TBL instructional community is the Team-Based Learning Collaborative (teambasedlearning.org). The collaborative provides three levels of TBL training and certification for those implementing TBL in both face-to-face and online environments. Many practitioners

access informal support and mentoring through the TBLC website and list-serves (e.g., teamlearning-l@lists.ubc.ca and dr-ed@list.msu.edu). Access to supportive information technology resources within learning institutions is a key tool for successful implementation of online TBL and many resources are available for use by students in online gallery walk applications, such as Google's Jamboard or bubbl.us, for idea or concept mapping. Existing major learning-management systems can be used to support TBL in the online environment; additional TBL-specific platforms are also available.

The colocated classroom is easily managed by a single instructor and experienced TBL practitioners have successfully transitioned their courses online. However, for the newer practitioner who is starting with TBL in the online environment, it may initially be helpful to have support to manage the various elements of the learning-management system, the meeting platform, and the instructional materials. Support may be available from a teaching assistant or by merging two sections of a course and coteaching with another instructor. Content expertise is not required for assistance in navigating online platforms. Dorneich and colleagues (2010) offer practical solutions and strategies for technical issues. An asynchronous class requires the same support from other faculty and the technology team.

Best Practices for Implementing Online TBL

For those seeking a detailed roadmap for online TBL implementation, Clark and colleagues (2018) developed a white paper detailing best practices and crosswalking the essential elements and practices of TBL with the quality matters standards for online education (2018).

Setting Student Expectations for Online TBL

Whether using in-person or online TBL, an orientation step precedes the other phases (Clark et al., 2018). Orientation is crucial for establishing instructor–learner and learner–learner social presence and to set expectations for how the course will be run and everyone's respective responsibilities. The three phases of TBL and peer evaluations are addressed.

In addition to course content, a robust orientation about teaching strategies and required learner activities is often overlooked but essential for student success. The orientation must also help learners to understand that the TBL teaching strategy offers them an opportunity for deep learning of the course content. Best practices for orientation include three principles. The first orientation principle focuses on the components of the course requirements and content and an introduction to the TBL activities. Students who are new to the TBL teaching strategy need to understand why this particular teaching modality has been adopted (see Clark et al., 2018). Included in the orientation are details of how to communicate with the instructor and fellow learners and a review of the technological requirements for managing the course, including how to access and submit assignments.

The second orientation principle requires instructors to form permanent teams; teams then have the opportunity to practice the RAP process (iRAT and tRAT) and the application exercise during orientation practice. A no-risk practice helps to make the process clear and familiar, without grade-related consequences, so that students begin the class with a realistic idea of the course processes, requirements, and activities.

The third orientation principle requires that the instructor is introduced to students right at the beginning of the course and that students are introduced to each other. A welcome video from the instructor is recommended because it gives students another experience of inclusion with the course. Introductions foster the development of social presence with the individual student and the instructor and among students. Synchronous or asynchronous methods may be used for instructor–student and student–student introductions. Introductions can occur in real time synchronously through an online meeting platform, or asynchronously through an active discussion area dedicated to introductions of class participants along with pictures of the students or short videos prepared by students. Students can include comments on their background related to the course content, their major, and professional or career goals. The instructor’s introduction can consist of their experience with the course content and how it influences the course structure. Table 1 shows the time order of orientation activities and the orientation principles and quality matters standards for higher education (2018) that apply to each one.



NOTES

Table 1
Time Order of Orientation Activities with TBL Orientation Principles and Quality Matters Standards

Order of Orientation Activities	TBL Orientation Principles ^a	Relevant Quality Matters Standards for Higher Education (6th edition) ^b
1. Introduction letter and video, includes how to get started and where to find course materials	A, C	1.1-1.8, 2.3-2.4, 3.1-3.3, 4.2, 5.3-5.4, 6.2, 7.1-7.4, 8.6
2. Short rework assignment in introduction letter (individual)	A	4.2, 8.1-8.5
3. Instructor and all learners engage in introductory discussion	A, C	1.9
4. Teams are created by instructor	B	5.2
5. Teammates share contact information	C	1.9
6. Required no-risk assignment to find important information in online learning platform (individual and/or team)	A	1.1, 8.1-8.5
7. Required no-risk, ungraded iRat (individual)	A	5.1
8. Required ungraded team assignment (tRAT and application)	A, C	5.1-5.2, 5.4
9. Teams establish meeting schedule to work on applications	A	5.2, 5.4

Key to Table 1

^a TBL Orientation Principles:

A= First Principle: Provide course requirements and content and introduction to TBL activities.

B= Second Principle: Form permanent teams.

C= Third Principle: Instructor is introduced to students at beginning of course; students are introduced to each other.

^b Quality Matters General Standards:

1=Course Overview and Introduction, 2= Learning Objectives, 3=Assessment and Measurement, 4=Instructional Materials, 5=Learner Activities & Learner Interaction, 6=Course Technology, 7=Learner Support, 8=Accessibility & Usability.

Including the three best practice principles for a robust orientation provides multiple benefits. Including student introductions in the orientation also allows the student to begin understanding fellow students' resources and strengths. It also helps create a social presence and can help to reduce isolation often

experienced by online (and perhaps quarantined) learners by fostering a sense of belonging to a group of individuals who can assist them with their learning.

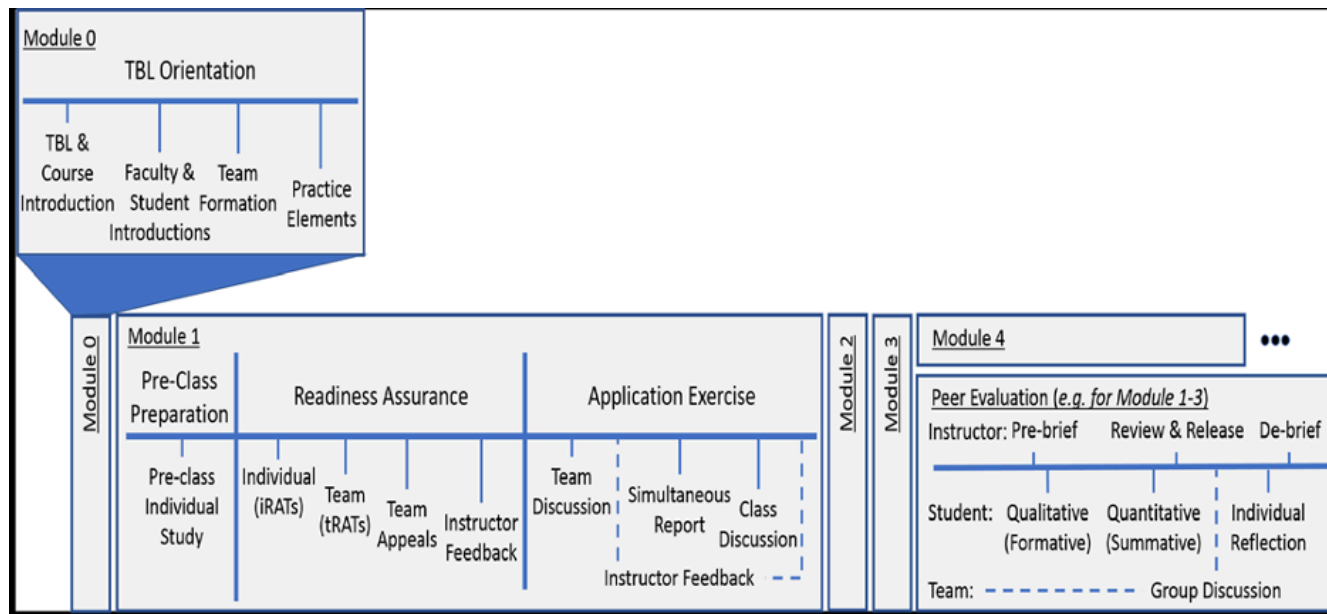


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Promoting Meaningful Engagement and Interaction in Online TBL

In an online environment, classes can be presented synchronously, asynchronously, or using a combination of both. In fully synchronous online TBL, the classes occur in much the same way in real time as colocated class sessions using a meeting platform. Asynchronous presentation presents challenges in providing the rich engaging, collaborative experience with team members, crucial for the full TBL learning experience. Nevertheless, though demanding a well-designed course allows for rich collaborative experiences.

Instructor Presence and Learner Collaboration in Synchronous and Asynchronous Classes

The instructor establishes a schedule for the three steps so that students know when preparation materials for each module have to be completed, when the RAP will occur, and when the associated application activities must be completed. Learners need to be aware in advance of the due dates for all their responsibilities. For the asynchronous RAP, the iRAT and tRAT are made available in the online platform within a predetermined time range. Individuals complete the iRAT and then teams are responsible for completing the tRAT together; one student typically enters the response to the tRAT for the team. Depending on the learners, in the online environment faculty can either preselect tools for learner collaboration or allow learners to select their own virtual platforms.

Once the RAP is completed, the relevant application activities are made available, to be completed in the designated time frame. As in colocated or synchronous online classes, learners work on the same, significant problems with specific responses—three of the four Ss. Simultaneous response, the fourth “S,” is handled differently.

Learners meet in real time or use discussion boards and chat functions to develop and present their thinking about the application exercise. Instructors may require discussion board entries specific to a grading rubric to evaluate learner progress. The final component of the application activity, simultaneous reporting (the final “S”), is crucial for learning and is typically accomplished by teams handing in their specific choice for an answer with a rationale. Team responses are then published simultaneously by the instructor at a designated time. Teams are required to view them and select the one they feel answered the question thoroughly, also by a specific time.

Instructors proactively design their courses to include frequent and regular instructor participation and presence throughout the course, in a way that is apparent to learners (Garrison, 2007). In synchronous classes, instructors visit breakout rooms during the RAP and applications to gauge team process and progress, promoting student accountability, similar to what occurs in colocated classes. In TBL, instructors remain completely neutral and do not provide guidance or information about the assignment to any team.

Recent work has identified several key barriers to implementing TBL for online and face-to-face learning in medical education (Burns et al., 2014; O’Doherty et al., 2018). Barriers included lack of instructor time, instructor reluctance, inadequate technical skills and infrastructure, lack of institutional support, and lack of strategic positioning for online learning. These works also suggested corresponding solutions, including providing motivational structures and opportunities for educators to support development and implementation of relevant skills. In the current environment of COVID-19, the question of whether to move instruction online has become moot, overriding concerns of instructor reluctance and institutional hesitancy to redirect resources to online learning.

Learner Skills and Readiness

We can expect that most college and high school learners have grown up with access to technology and are well-prepared for online learning using interactive platforms. However, learners are often acculturated to personal use of social media, so using online TBL provides extensive opportunities for socializing learners to professional communication online, which will only become more important as they continue into the workplace. Initial discomfort with moving from more passive forms of learning to the active learning required in TBL, tends to resolve with experience and as learners discover that their knowledge acquisition is improved (Haidet et al., 2014; O’Doherty et al. 2018; Fatmi et al., 2013).

Conclusion

The future of education will include increased reliance on and leveraging of online environments and platforms. The TBL method stands out among instructional modalities in having extensive learner–learner collaboration and instructor–learner interaction, facilitating both learning and social connectedness, and the method translates fully from colocated to online environments.

As an evidence-based small-group learning approach, TBL supports teams working together to clarify fundamental principles related to the module content as well as solving complex problems (Clark et al., 2018; Michaelsen et al., 2002; Cohen & Robinson, 2018). The highly structured instructional process using teams motivates online learners to contribute to the team process and use the team’s collective skills. Thus, the responsibility for learning outcomes is both that of the individual learner and that of the team. Moreover, instructor expectations for learners to participate and complete course activities are associated with learner engagement and course completion (Kuh et al., 2004).

Michel et al. (2018) consider rigor essential for all university programs, and to assure rigor, two components are essential: (a) cognitive complexity and (b) standards and expectations. TBL provides both components and the instructional sequence moves through Bloom et al.’s revised taxonomy, using levels of increasing cognitive complexity (Anderson & Krathwohl, 2001). TBL satisfies the crucial elements of deep learning in online, active learning communities (Garrison, 2007), namely, social presence in the form of teams, teacher presence (course design and providing frequent feedback), and cognitive presence embodied in every phase of the TBL process. Other crucial factors that influence learner success include the availability and use of resources and online learning support, along with information technology services (Zhang et al., 2018). Finally, the TBL process parallels many of the skills required for future work environments, namely openness to the opinions of colleagues, shared decision making, socialization into working teams, and promotion of self-directed learning.

The features of TBL involve frequent contact and promote increased social interaction and connectedness, thus providing a structured, predictable mechanism to reduce social isolation for both learners and instructors. Many faculty report feeling really disconnected in online education, particularly when students choose to stay off camera. In TBL, instructors have the opportunity to connect frequently with learners in the large group and in their teams, so instructors get more interactive feedback in real time with learners in synchronous TBL and through team and large-group discussion boards (such as an open “ask the instructor” board) in asynchronous TBL. In asynchronous TBL classes, instructor presence can be achieved with frequent video and narrative postings throughout the semester. Increased interaction between instructors and learners, together with highly structured activities and peer evaluation afford instructors a good sense of how their students are doing academically and in terms of well-being.

We recommend that those considering TBL take advantage of formal training opportunities and certification (through the TBLC, or TBLC Certified Trainer Consultants) and the informal TBL community.

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