Medical Teacher

ISSN: 0142-159X (Print) 1466-187X (Online) Journal homepage: informahealthcare.com/journals/imte20

Twelve tips for facilitating team-based learning

Charles Gullo, Tam Cam Ha & Sandy Cook

To cite this article: Charles Gullo, Tam Cam Ha & Sandy Cook (2015) Twelve tips for facilitating team-based learning, Medical Teacher, 37:9, 819-824, DOI: 10.3109/0142159X.2014.1001729

To link to this article: https://doi.org/10.3109/0142159X.2014.1001729

Published online: 10 Feb 2015.

2015, 37: 819–824 MEDICAL TEACHER

TWELVE TIPS

Twelve tips for facilitating team-based learning

CHARLES GULLO, TAM CAM HA & SANDY COOK
Duke NUS Graduate Medical School, Singapore

Abstract

Background: Team-based learning (TBL) has become a more commonly recognized and implemented pedagogical approach in curricula of numerous disciplines. The desire to place more autonomy on the student and spend less in-class time delivering content has resulted in complete or partial adoption of this style of learning in many educational settings.
Aim: Provide faculty with tools that foster a well facilitated and interactive TBL learning environment.
Methods: We examined the published literature in the area of facilitation – specifically in TBL environments, and explored learning theories associated with team learning and our own experiences to create these facilitation tips.
Results: We created 12 tips for TBL facilitation designed to assist faculty to achieve an effective and engaging TBL learning environment.
Conclusions: Applying these twelve tips while facilitating a TBL classroom session will help to ensure maximal participation and optimal learning in a safe yet stimulating environment.

Introduction

Team-based learning (TBL) traces its roots to Professor Larry Michaelsen at the University of Oklahoma, United States (USA) in the late 1970s. Since then, it has grown to become a popular and effective instructional strategy used in a number of different educational settings (Koles et al. 2010; Parmelee & Michaelsen 2010a; Kamei et al. 2012; Fatmi et al. 2013). Although Michaelsen implemented it in graduate business instruction, it has more recently been used as a major teaching platform by a number of different educational programs across the United States (Team-Based Learning Collaborative 2013) and in a number of medical schools (Thompson et al. 2007a,b). At the Duke-NUS Graduate Medical School in Singapore, we have been using this teaching methodology since 2007 as a primary mode of learning for our students during their pre-clinical instruction (Kamei et al. 2012). The benefits of this teaching methodology are numerous, and have been well-documented in a number of sources (Hunt et al. 2003; Zgheib et al. 2010; Sisk 2011; Fatmi et al. 2013; Hazel et al. 2013).

For those who may not be familiar with the structure, in brief, students are placed in teams of 5–7 learners. These teams stay together for an extended period of time. The TBL process is made up of three phases: (1) Preparatory phase, where students are given material to study before they come to class. (2) Readiness assurance test (RAT), where students take both an individual (IRAT) and a team (TRAT) test to assess their understanding of the pre-class material. (3) Application phase, where students apply what they have learned in meaningful case-based exercises. During this phase, students are asked to work in teams to apply the knowledge formally assessed during the readiness assurance phase (IRAT/TRAT; refer Figure 1 for an illustration of these steps; Michaelsen & Sweet 2008). While a seemingly simple process, the heart of creating an engaging and impactful inter-team discussion is an effective facilitation. Yet, effectively facilitating these discussions can be one of the most challenging aspects of TBL.

Practice points

Facilitation is:
- Critical to effective learning in TBL.
- A skill that can be learned – but does require practice.
- The real role of an effective teacher – to facilitate learning.
- A shift in the teacher/student relationship.

It is important to first define how TBL facilitation may differ from facilitation in other small group settings and then where in the TBL process facilitation is typically used and critical. While basic facilitation skills are necessary in all learning situations; unlike lectures, small group or problem based learning (PBL) environments, TBL's added challenges for facilitators is in the inter-team engagement, keeping all learners engaged and accountable, eliciting the answers from the class, and challenging learners understandings and assumptions (before revealing the faculty's answer).

There are three places where directed facilitation occurs in TBL (Figure 1). The first place that a facilitated discussion

Correspondence: Sandy Cook, Associate Professor, Duke-NUS Graduate Medical School Singapore, 8 College Road, Singapore 169857, Singapore. Tel: + 65-65168722; Fax: +65-62272698; E-mail: sandy.cook@duke-nus.edu.sg

ISSN 0142-159X print/ISSN 1466-187X online/15/090819–6 © 2015 Informa UK Ltd.
DOI: 10.3109/0142159X.2014.1001729

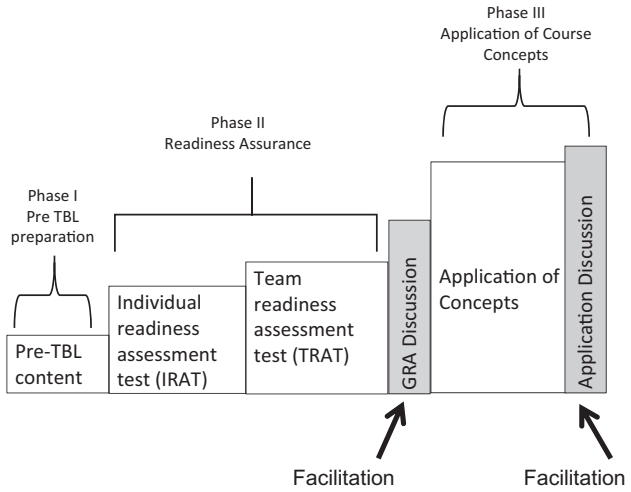

Figure 1. Structure of team-based learning and places where facilitation occurs.

occurs is *after* (and importantly not *during*) the team readiness assurance test (TRAT). This facilitated discussion requires faculty to be able to draw out the misunderstandings or resolve any misconceptions not addressed by the non-facilitated inter team TRAT discussion and reveal "correct" answers. Being skilled at guiding the students to discuss and ask questions about their uncertainties maximizes the learning.

The next place where facilitation is critical in TBL and further enhances the learning experience is *after* the application phase. The post-application discussion requires faculty to create a dynamic classroom discussion and assist students to articulate their understanding of difficult concepts or critique their own and others thought processes when solving the problems. It is through this inter-team discussion where a deeper understanding and learning can be achieved. In both the post-TRAT and application setting, one of the most difficult activities faculty have is in managing the unexpected questions and eliciting rather than giving answers.

Managing the post-TRAT and application discussions between multiple teams in a classroom setting requires a very different set of skills from managing the typical learning environment to which most faculty are accustomed. One reason for this difficulty is that the RAT and the application phases of TBL encourage both assimilative learning, the process of incorporating new information into existing knowledge structures (Seel 2012), and transformative learning, the process of altering existing knowledge structures through critical thought (Mezirow 1991). The latter is enhanced through the discussion with team-mates who learn from one another (Meers-Scott et al. 2010). Appropriate facilitation after the team's independent discussion enhances the transformative learning process if performed effectively. This type of facilitated learning is referred to as the "Elaborative Interrogation Technique," an effective learning methodology (Dunlosky et al. 2013). Although some of the properties of being a skilled facilitator may appear to be more of an art than a science, we believe that many of the skills can be learned. Below are our 12 tips for effective facilitation, aimed at providing faculty with skills that are useful in promoting effective learning within a team-based environment. We have divided the tips into two categories: creating the right environment and enhancing active engagement of learners.

Creating the right environment

The major role of the facilitator is to create a safe and engaging learning environment while still managing the flow and time. These first six tips focus on the process of TBL, role of facilitator, and activities a facilitator can do to best create the right learning environment.

Tip 1

Use the 4S's to craft engaging questions

Using all aspects of the TBL structure goes a long way in ensuring full student participation. The IRAT followed by the TRAT ensures that students come well-prepared to discuss issues and identifies their gaps so they are ready to learn. Using the four S's of application writing and development (significant problem, same problem, specific choice, and simultaneous report) can also ensure maximal participation and active engagement during the application phase (Parmelee & Michaelsen 2010b). The use of significant/authentic problems, having everyone working on the same problem, requiring them to make a single choice (and defend it), and enabling simultaneous reporting, is the start of creating a problem that will enable a more stimulating environment in which to facilitate.

Tip 2

Watch the clock

One of the most difficult tasks for a facilitator to perform in the TBL classroom is to keep within the allotted time. One of the benefits of TBL is that discussions are brought "front and center". Ensuing that various arguments are brought out in the open can be time consuming. Therefore, the first priority is to make sure that enough time has been scheduled for the discussion phases. Ideally, the discussion phase should be at least half the time allocated. In a 50-min class, that would be roughly 25 min for RATs (both individual and team) and 25 min for discussion. The application phases should follow the same guidelines. A 25-min application should be accompanied by a 25-min discussion phase (longer if possible). The facilitator must constantly be alert for diminishing time and make adjustments as he/she goes along as to how much discussion is to be pursued. This may mean interrupting students who are taking a very long time to respond, asking faculty to cut short their explanation or tactfully interrupting those who have launched into a full-length didactic lecture, or even dramatically shortening the team-to-team discussion phases after some questions. Being aware of the time means also being realistic about the number of questions in each session. Having too many questions and insufficient time to review and discuss can be frustrating to the students.

Tip 3

Strategize the process of facilitation with faculty before class

It is important to strategize before the session how the questions should be facilitated, especially if you have a facilitator who is different from the course director or content expert. In practice, not all questions require an in-depth facilitated discussion. Certain questions may have limited learning points which students can grasp easily by themselves and thus need not be discussed at length if time is short. One time-efficient way to implement this approach is for faculty to consider a facilitation strategy for each RAT question while students are working on the questions. For the application questions, it is ideal if teams turn in responses as they complete them so faculty are informed of the answers once the students have chosen and consider the facilitation strategy based on the answers given. For example, if all teams answer a particular question correctly, the facilitator may choose not to have an in-depth facilitated discussion as there may be no further learning points to be covered. Conversely, if all teams answer the question correctly but there are critical learning points, or faculty want to be sure the teams derived the correct answer for the right reason, such a question may benefit from a facilitated discussion. The faculty may also decide that if the teams choose many different answers for the same question, a good strategy may be for the teams to debate, as a whole class, why they chose their answer.

Tip 4

Remember facilitation is NOT delivery of content

As teachers, we want to ensure our students receive the necessary information. Thus, in TBL, it can be difficult to remember that at certain points one must be a facilitator of learning, not the deliverer of content. Carl Rogers discussed in his publication "Freedom to Learn" (Rogers 1969) that the facilitator in a classroom is one that "creates the environment for engagement" and is obligated to create an environment where "the threat to the learner is reduced to a minimum". He was a strong proponent of minimizing one's expertise as much as possible when facilitating in an educational setting so as to avoid teaching a person directly, but facilitate his or her own learning. This sentiment is at the heart of TBL. Thus, when facilitating in a TBL learning environment, removing the "content expert" hat and putting on a "facilitator's hat" may be the single most important and difficult step faculty face when engaging students.

Tip 5

Avoid giving away answers during facilitation phase

As the role of the faculty during the facilitation phase is to "facilitate" the learning and elicit information from the students, it is critical to remain neutral and non-judgmental with the discussion as it develops. During the learner debate phase of the discussions, any sign of approval or disapproval of a comment or response will shut down the discussion immediately. As the goal of the TBL in-class facilitated discussion is to ask certain questions to ascertain the student understanding and knowledge of concepts and to encourage them to articulate these concepts and main points of an argument and to teach one another, keeping the discussion going is paramount. It is often very difficult for a faculty member to hide their opinion when a given response is factually incorrect or when it is exceptionally brilliant. One way to minimize this might be to identify one faculty as the facilitator and a different one as the "content" expert. In many ways, someone the students do not view as the main content person can make an excellent facilitator. The facilitator needs to know enough of the content to know how to direct the questioning (with pre-session guidance from the course director or "content" expert).

Tip 6

Provide time for closure

One of the most important things that a facilitator should remember to do is provide time for closure at the end of the session. Providing closure after each question makes it difficult to manage time. However, highlighting a student's excellent response or one who corrects an argument that was inaccurate can go a long way to bring satisfaction and clarity to the learning in the classroom and is not time intensive. Yet, it is still important to bring formal closure to conceptually difficult material at the end of a session as students often do not explicitly trust each other's knowledge-base and prefer to hear from an expert faculty member or facilitator. Thus, adding closure to difficult concepts after but not during student discussions will assist in ensuring that students feel that the TBL process was valuable and that they learned the important "take-home" information.

Enhancing active engagement of learners

The quality of a TBL session depends a lot on the facilitator's ability to get the students engaged, but getting students to respond to questioning is difficult under most circumstances. There are several general suggestions to achieve classroom engagement. First, be open and transparent about the intention and process of asking questions. Second, create a safe environment where students can answer incorrectly without fear of ridicule or recrimination. Third, consider using a randomization process (random team and random members within the team) to decide who to call upon. That way, students will not feel "picked" on. Even if the environment and processes are all in place, it can still be difficult to get students to participate. Tips 7–12 provide some strategies one can use to encourage reluctant learners to speak up.

Tip 7

Wait for students to respond to questions

It is easy for a facilitator to forget that students often become nervous and need time to gather their thoughts when asked to answer a question or to defend a response to a question during the RAT or application phases of TBL. Students do understand that during the classroom discussion phases of TBL they all must be prepared to defend the choices their teams have made, though it is reasonable to expect that they need some time to remind themselves what the issues were. Thus, when calling on students to respond, the facilitator is encouraged to give more time than he/she feels is necessary. Oftentimes, the silence following a question is not due to confusion over what was asked, but due to time they need to think about the way they wish to phrase their response. Other times, it is necessary for the student to consult his or her team mates as a reminder of why they answered something the way they did. Allowing up to 30 s may be necessary and expected. This is certainly difficult to do when time is limited and many questions are still remaining. If students feel that the environment is safe and tolerant, then they will engage more actively. Allowing for enough "dwell-time" after each student is called on should help in this regard.

Tip 8

Ask neutral and open-ended questions

One of the best practices a facilitator should adopt is to ask an open-ended question to a specific person in the classroom that forces them to critique, analyze, justify, and explain their choice of answer (Silberman & Auerbach 2011). Questions that allow for a yes or no response will generally cease any further discussion. Questions that lead or direct a student towards a certain specific answer will also halt any further discussions, as the students perceive that they need to focus on the answer provided. Open-ended questions allow students to demonstrate their thinking. They also allow for easier follow-up questions, such as ones that force students to clarify or justify their responses. Questions which are more neutral, objective, and open-ended result in more informative and valuable responses from the entire classroom. A commonly used open-ended question is the "why" type of question, e.g., why did you chose this, why is this the better choice over other answers, or why not this option? Neutral open-ended questions will ensure active discussion occur and assist in the interrogation of students' knowledge.

Tip 9

Rephrase or restate for clarity

As mentioned above, we want to create a safe environment where students can answer incorrectly without fear of ridicule or recrimination. One way of achieving that type of environment, which will help students willingly speak up, is to rephrase (with guidance towards the learning goal) when students present their team's rationale to be sure the facilitator understands the answer. Sometimes this is necessary just because students may not speak in a clear and concise manner and often they are not heard by students in another corner of the room. Students are often not confident when addressing the classroom and are reticent to vocalize what they know or do not know. Students also frequently display "drift", a process where they start reporting in a confident and audible fashion, but end in a barely audible and less confident tone. By summarizing and restating what was said by the student, a facilitator can keep learners engaged and ensure that everyone hears and that (1) unclear information is clarified, (2) overly complex information presented is simplified, (3) incorrect information is stated (non-judgmentally) to elicit debate, and (4) principles can be repeated for best learning and retention. It is important to note that although the facilitator is repeating or rephrasing content for clarity often, during the facilitation process he or she is not ending discussion by "leaking" the correct answer or slipping into lecture mode and removing the students from the discussion. The process of succinctly repeating what a student has said benefits the entire classroom and goes a long way in making engaging and informative TBL sessions a success.

Tip 10

Find the "student expert" in the room

During any cross-examination of teams, it is important to recognize that somewhere in the classroom exists an expert who needs to be identified. Even the most difficult problems can usually be resolved by a student in the TBL classroom. And, only after attempts are made at finding that student expert should a facilitator either turn to a "content expert" for assistance or provide the answer to the problem him/herself. In fact, correcting or answering too early will result in shutting down any further conversation and interrupts self-enquiry from the students. Thus, as a rule, the facilitator should put on the "content expert" hat only after making sure that students get the opportunity to probe each other's thinking as much as possible. It is often difficult to find the student expert in the classroom as students can be unsure of themselves and may not trust their colleagues either. One of the best ways to achieve this is to ask probing questions such as "What evidence supports this?" or "Can anyone assist us to resolve this issue?"

Tip 11

Ensure any lingering uncertainties or disagreements are addressed

Often there is significant divergence in the thinking behind a particular concept in the classroom and this may or may not be apparent due to the consensus building process inherent with TBL. Students will often report what they feel pressured by the team to report to avoid looking unknowledgeable even if they do not agree with their own team's decision. Sometimes, a student will say that he/she felt one way but the team felt a different way about a particular question. It is important for

facilitators to ask if there is someone in the classroom who agrees or disagrees with what was just reported and to do this often. It is those strong disagreements or uncertainties that produce the most learning as discussions tend to be more robust and passionate when people disagree. If students feel safe in expressing their opinions, then the level of classroom engagement can be allowed to reach its peak. Therefore, it is important to remember to seek out possible disagreements and try to get students to address them as they arise.

Tip 12

Hold each individual learner accountable

By creating an environment where each student knows they could be called upon at any time to respond or defend a team's answer, you further ensure individual student and team accountability. As individuals, students will realize they must be prepared. As a team, they will try to make sure their teammate represents the team well. It is advisable to avoid the assignment of a team spokesperson whenever possible and to remind students often that they are responsible for their team's responses and choices. In addition, students must be reminded constantly that although their individual choices may vary, they should be prepared to defend their team's decisions and explain their decision making processes to the classroom. Students who are constantly asking other team members for help may be called upon more often by facilitators who observe the classroom continuously. A facilitator who creates an effective "environment for engagement", where the atmosphere is fair and tolerant and where people can feel free to make mistakes without fear of embarrassment, is best suited to create an environment of maximal participation. In large classrooms with more teams, it is even more important for facilitators to scan the room and identify individuals in the far corners who may be less engaged. Using students' names when calling on them, in the right environment, will help student feel as though the facilitator knows them personally and they cannot hide by being anonymous.

It is also important to get participation from as many different individuals as possible and to avoid picking on the same vocal individuals repetitively. Again, there are no assurances that anyone can give to ensure that each student is giving 100% of their time, but active surveillance and constant vigilance can ensure that the participants remain as active as possible.

Conclusions

As more interest is garnered around the use of TBL in the classroom, educators are interested in understanding how to manage the discussion phases to ensure complete and deep learning. A fair amount has been written concerning the various stages of TBL, the backward design elements, and the pedagogical elements of TBL (Michaelsen et al. 2008). Although some information has been published concerning facilitation in PBL (Leung et al. 2003; Yee et al. 2006), very little information is available on specific recommendations for effective facilitation of learning in the TBL classroom (Azer 2005). The 12 tips presented here are designed to assist faculty who facilitate discussions in the TBL classroom in two ways. First, application of these tips will help to ensure maximal and consistent participation from students and provide continuity to sessions if adhered to by all faculties who teach different sessions. Second, these tips are designed to assist the faculty who deliver TBL by recommending a platform that ensures a fair and safe learning environment, but one that holds students accountable to their own learning as well as that of fellow learners. A universal role of a facilitator is to observe the 90:10 rule – listen 90% of the time and talk 10% of the time (Silberman & Auerbach 2011). We consider the principle of listening more than you talk a sign of an effectively facilitated session.

Although the tips presented in this article are designed for faculty who teach in a TBL setting that promotes a maximal learning experience for their learners, many of these tips would work well in any classroom setting. For example, the principle of waiting to speak for a defined period of time after asking students a question is quite useful when using any teaching style. This same reasoning holds for asking neutral and open-ended questions. However, many of these tips are specific to TBL as this teaching style requires the management of multiple teams and its goal is to achieve maximal student engagement. For example, when providing a lecture to students, generally closure is automatically given. However, one of the important principles of TBL is the emphasis on self-discovery and self-directed learning. Thus, remembering to provide closure or a sufficient wrap-up in this environment is equally important. The same can be said of the separation of the content delivery from the facilitation of learning. The lecture-dependent teaching style requires the content expert to be in the content delivery mode most of the time. However, in PBL and TBL, the students must make their own discoveries first and they must identify the important content and understand it before a content expert clarifies and adds to the content.

Much of facilitation in the TBL classroom is a strategy and can be learned. These tips can play a role in this process. However, it is clear that there is some "art" to the practice of being a good facilitator. This art is hard to teach. Experience and practice is the best way to learn the "art of facilitation". Some faculty may find facilitation in the TBL classroom a challenge. Others will find it intuitive, fun, and exciting and may do well without much training. However, in either case, we hope that faculty either new to facilitating or those who have been doing this for some time find these tips for effective facilitation in the TBL classroom most useful and practical.

Notes on contributors

CHARLES GULLO, PhD, is now the Associate Dean for Medical Education, Joan C Edwards School of Medicine, Marshall University, Huntington, WV.

TAM CAM HA, PhD, is an Assistant Professor at Duke-NUS Graduate Medical School, involved in facilitation, curriculum construction and faculty development.

SANDY COOK, PhD, is a Senior Associate Dean, Office of Education, and Associate Professor at Duke-NUS Graduate Medical School.

Acknowledgments

We would like to acknowledge the entire facilitation team here at Duke-NUS Graduate Medical School Singapore for their inspiration, dedication to the practice of facilitation, and for their support and encouragement; they are Dr. Janil Puthucheary, Dr. Suzanne Goh, and Dr. Tam Cam Ha. We would also like to acknowledge continued support and mentorship by the former course director of the Body and Disease course at Duke-NUS GMS, whose vision made TBL so productive and effective here (Dr. Doyle Graham). We also want to thank Ms. Jamie Farquhar for her assistance with formatting and other administrative support.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

12 Tips for facilitation

Creating the right learning environment:

- Use the 4S's to craft engaging questions
- Watch the clock
- Strategize the facilitation process with faculty before class
- Remember facilitation is not delivery of content
- Avoid giving away answers during facilitation phase
- Provide time for closure

Engaging reluctant learners:

- Wait for students to respond to questions
- Ask neutral and open ended questions
- Rephrase or restate for clarity
- Find the "student expert" in the room
- Ensure any lingering uncertainties or disagreements are addressed
- Hold the individual learners accountable

References

Azer SA. 2005. Challenges facing PBL tutors: 12 Tips for successful group facilitation. Med Teach 27(8):676–681.

Dunlosky J, Rawson KA, Marsh EJ, Nathan MJ, Willingham DT. 2013. Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. Psychol Sci Public Interest 14(1):4–58.

Fatmi M, Hartling L, Hillier T, Campbell S, Oswald AE. 2013. The effectiveness of team-based learning on learning outcomes in health professions education: BEME Guide No. 30. Med Teach 35(12):e1608–e1624.

Hazel SJ, Heberle N, McEwen MM, Adams K. 2013. Team-based learning increases active engagement and enhances development of teamwork and communication skills in a first-year course for veterinary and animal science undergraduates. J Vet Med Educ 40(4):333–341.

Hunt DP, Haidet P, Coverdale JH, Richards B. 2003. The effect of using team learning in an evidence-based medicine course for medical students. [Research Support, U.S. Gov't, Non-P.H.S.]. Teach Learn Med 15(2):131–139.

Kamei RK, Cook S, Puthucheary J, Starmer CF. 2012. 21st Century learning in medicine: Traditional teaching versus team-based learning. [Education]. Med Sci Educ 22(2):57–64.

Koles PG, Stolfi A, Borges NJ, Nelson S, Parmelee DX. 2010. The impact of team-based learning on medical students' academic performance. Acad Med 85(11):1739–1745.

Leung KK, Lue BH, Lee MB. 2003. Development of a teaching style inventory for tutor evaluation in problem-based learning. [Research Support, Non-U.S. Gov't]. Med Educ 37(5):410–416.

Meers-Scott D, Taylor L, Pelley J. 2010. Teaching critical thinking and team based concept mapping. [Educational]. In: Torres PL, Marriot RV, editors. Handbook of research on collaborative learning using concept mapping. Hershey, PA, USA: IGI Global. pp 171–186.

Mezirow J. 1991. Transformative dimensions of adult learning. 1st ed. San Francisco: Jossey-Bass.

Michaelsen LK, Parmelee DX, McMahon KK. 2008. Team-based learning for health professions education: A guide to using small groups for improving learning. 1st ed. Vol. 1. Sterling, VA: Stylus Publishing, LLC.

Michaelsen LK, Sweet M. 2008. The essential elements of team-based learning. New Direct Teach Learn 2008(116):7–27.

Parmelee D, Michaelsen LK. 2010a. Team-based learning: It's here and it WORKS! Acad Med 85(11):1658; author reply 1658–1659.

Parmelee DX, Michaelsen LK. 2010b. Twelve tips for doing effective team-based learning (TBL). Med Teach 32(2):118–122.

Rogers CR. 1969. Freedom to learn: A view of what education might become. Columbus, OH: C. E. Merrill Pub. Co.

Seel NM. (2012). Assimilation theory of learning. In: Encyclopedia of the sciences of learning. New York: Springer. pp 324–326.

Silberman M, Auerbach C. 2011. Active training: A handbook of techniques, designs, case examples, and tips. 3rd ed. Vol. 3. San Francisco, CA: John Wiley & Sons.

Sisk RJ. 2011. Team-based learning: Systematic research review. [Review]. J Nurs Educ 50(12):665–669.

Team-Based Learning Collaborative. 2013. [Accessed 30 October 2014] Available from http://www.teambasedlearning.org.

Thompson BM, Schneider VF, Haidet P, Levine RE, McMahon KK, Perkowski LC, Richards BF. 2007a. Team-based learning at ten medical schools: Two years later. Med Educ 41(3):250–257.

Thompson BM, Schneider VF, Haidet P, Perkowski LC, Richards BF. 2007b. Factors influencing implementation of team-based learning in health sciences education. Acad Med 82(10 Suppl):S53–S56.

Yee HY, Radhakrishnan A, Ponnudurai G. 2006. Improving PBLs in the International Medical University: Defining the 'good' PBL facilitator. Med Teach 28(6):558–560.

Zgheib NK, Simaan JA, Sabra R. 2010. Using team-based learning to teach pharmacology to second year medical students improves student performance. Med Teach 32(2):130–135.