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Team-based learning (TBL): An Argument for Faculty's Evaluation

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Abstract
Team-based learning (TBL) is increasingly used for presenting educational information to students in colleges of pharmacy. Several studies have shown a positive impact on students both in terms of academic performance and comprehension. Current literature does not provide the full perspective of faculty, who are incorporating this methodology into the classroom. Cross-sectional surveys and commentary within manuscripts describe mixed findings regarding the faculty's perception of TBL. The aims of this paper are: 1) to describe why faculty evaluation of TBL is important, 2) to outline variables for consideration in faculty evaluations of TBL, and 3) to describe uses for the data from faculty evaluation of TBL.

Background
Team-based learning (TBL) is an instructional teaching method in which students work independently prior to the allotted class time to gain baseline subject matter knowledge. During class time they interact as a team (typically comprised of 4-6 students) towards a common goal of understanding class/course objectives.[1] Compared to didactic lecture, the aim of TBL is to increase the level of the students' engagement and promote a higher level of learning within the content. Many publications have evaluated pharmacy content utilizing TBL in a variety of classes and courses.[2-15]

TBL is thought to have benefits for faculty as well.[1] With the use of TBL, it is suggested that: 1) instructors do not have to worry about students missing or failing to prepare for class, 2) faculty and student interactions are more similar to work between colleagues, 3) faculty may develop more personal and rewarding relationships with students as they are listening and observing rather than lecturing, and 4) faculty tend to follow a more natural educational process with an emphasis on learning and not teaching. Moreover, utilizing TBL has been suggested to reduce faculty burnout.
A survey was previously conducted on faculty across the health-sciences to determine factors which contributed to the success of TBL.[16] Based on the results, it was suggested that buy-in by faculty and resources—space in particular—were necessary for positive TBL outcomes. Some negatives identified in this survey included increases in workload and lack of training and understanding of TBL by faculty.

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Although there is some information in the literature describing faculty perceptions of TBL, it is not the focus of the study question.[5,16,17] Additionally, an instrument has not been created to routinely capture the faculty perspective on using TBL, nor has a survey systematically collected the faculty perspective on TBL use over time. The aims of this paper are: 1) to describe why faculty evaluation of TBL is important, 2) to outline variables for consideration in faculty evaluations of TBL, and 3) to describe uses for the data from faculty evaluation of TBL.

Why Faculty Perceptions of TBL
It is important to understand the perception of the pharmacy faculty on utilization of TBL. Initially, getting faculty buy-in on this teaching method is critical. Many faculty may be set in their ways of teaching a specific course or lecture. Acceptance can be facilitated through presenting the advantages and disadvantages of TBL in a faculty development session, so faculty are aware of the philosophy, approach, methods, and outcomes of TBL. Faculty can get a sense of how TBL compares to current practices, as 'traditional lecture' may be executed differently based on institution, faculty, course, and topic. This session can be followed by an open dialogue to understand the faculties' position on this approach.

When changing an approach to teaching, changes in workload may be a consequence. The faculty who will be newly implementing TBL may have to redesign lectures, cases, quizzes/exams, and find/create learning that is appropriate for students prior to the class. Unexpected workload increases in didactic learning may negatively affect other components of workload, such as practice, scholarship, and student/resident training. Although this increase may

differ based on institution, faculty, course, and topic, it would be beneficial to quantify changes and duration of changes in workload to ensure it is adjusted to accommodate for implementation time.

In addition, the generalizability of published studies to individual institutions may be difficult. Specific courses and topics may be hard to generalize and not-well suited for TBL. Previous literature suggests improved retention and grades for students using this approach.[2,4,5,7,8,10,11] However, TBL may have been used in a setting where faculty wanted to incorporate this approach into their course. In a setting where TBL is new and taught by multiple faculty who may not necessarily have bought-in, the efforts by the faculty may lead to differing student outcomes. Outcomes of TBL research may be more aligned with published literature in which the faculty using TBL were already aware of its perceived benefits and wanted to follow through with incorporating this approach in their classroom. Gaining the opinion of the faculty using TBL (who may or may not have buy-in) may reveal a better understanding and applicability of the previously published literature.

What is Known about Faculty Perspectives

The opinion of pharmacy faculty on TBL has been previously evaluated in a faculty survey for an ambulatory care elective.[7] Questions that were asked of the faculty evaluated implementation, satisfaction, student impact, and time requirements. Compared to a lecture-based approach, the faculty members perceived that TBL required less overall time and concluded that they would consider using TBL in other courses. In this particular survey, common challenges included development of teams, facilitation, and identification of appropriate pre-reading; common strengths of TBL included observation of students' application of knowledge and student team development. Moreover, responses from a 15 question survey were completed by 69 faculty members across the United States over a variety of themes, including student engagement, team-work, and achieving course goals using TBL.[17] This cross-sectional survey concluded that faculty members perceived higher levels of student engagement, increased class attendance, increased student preparedness, obtained earlier identification of knowledge gaps, promoted achievement of outcomes, and improved knowledge retention when compared to traditional lecture.

Previous publications have also commented on pharmacy faculty perceptions of TBL within the body of the manuscript. Positive comments regarding TBL have included buy-in on the process of TBL,[2,5] support from administration,[2] observations of good student participation within small groups and in class-wide discussion,[5,15] and statements of enjoying TBL as an approach to learning.[8] Additionally, negative aspects of TBL have been obtained from faculty comments which concluded that significant revisions on course and objectives were necessary,[2,4,8] more time and meetings were required to understand and implement TBL,[4] teaching responsibility may have become misaligned with career development and promotion goals,[4] evaluations by the students may have been more difficult to interpret compared to traditional lecture,[4] an increased workload was necessary in the first year of implementation,[5] and an increase in time was required to further explain TBL during the first few sessions.[5] Moreover, there were conflicting commentaries from publications regarding both increases and decreases in time spent grading.[4,5] Having these opinions of faculty may allow a college/school to: provide better administrative support, make changes in work-load, and understand the need for additional TBL training. Gaining the faculty perspective may improve the delivery of TBL to the students and subsequently better student outcomes in learning.

Variables in the Faculty Evaluation of TBL

We propose that a faculty evaluation about TBL experience should center around three main principles: how TBL affects teaching and learning, overall impact on workload, and corresponding changes in student interaction. These are the three themes most likely to affect faculty perception, as well as their future participation in TBL activities. TBL evaluations have been performed for students.[18] The research focused on a larger student questionnaire of 39 items sorted into accountability, preference for TBL and student satisfaction. The analysis found increased student accountability, a more overall positive attitude/enjoyment of class, and that TBL was an effective approach for learning.

In our work in implementing TBL, a nine-question Likert response survey tool was created using components of previous surveys and anecdotal comments from faculty in published papers assessing TBL. Questions 1 through 5 assessed student accountability through interaction from the faculty perspective, as well as attitude and perceived workload for TBL versus traditional lecture (Table 1). Questions 6 through 9 assessed faculty satisfaction, such as the faculty member's willingness to use TBL in other classroom settings (Table 1). Each question posed to the faculty member focused on where TBL, as a teaching method, had an effect on lecturing, workload, and desire to use TBL in other courses offered at the college. This survey tool focused on providing specific data in the categories above to help faculty evaluate the decision to implement TBL within their course.

Our Experience

At St. Louis College of Pharmacy, TBL was implemented in PP2120: Introduction to Pharmaceutical Care: Nonprescription Products and Drug Information over one semester in Fall 2012. Approximately eight faculty members took part in this new process of teaching. At the beginning of the semester, students were randomly assigned to groups of 5 to 6 students to form the teams for the course. Other courses that implemented TBL have used a variety of information sources to help determine team structure.[19] Prior faculty experience at the college and the decision of course coordinators determined that this was the most impartial way to avoid introducing bias in the creation of teams.

The majority of the class was divided into ten therapeutic topics representing the majority of non-prescription products available over-the-counter (OTC) including analgesics, cough/cold, dermatology, and gastrointestinal topics. Each topic was taught using TBL methodology by an individual faculty member.

Students were required to watch a pre-recorded lecture from the faculty member for each topic, and some faculty used additional reading material, when required. A typical amount of class preparation averaged two hours prior to class. When students arrived at the first class session, they completed an Individual Readiness Assurance Test (iRAT) individually and a Team Readiness Assurance Test (tRAT) within their assigned teams. The second class period required students to complete a case within their teams and submit their responses as a group. Faculty reviewed the case for the class while encouraging input from each of the teams. This feedback allowed students to hear and understand the thought process of their fellow classmates.

Results of the Pilot

After the first semester of TBL implementation, all faculty participating in TBL in PP2120 completed the survey (n=8; 100%). There were both positive and negative responses towards TBL for this particular course. A majority of respondents (75%) indicated that there was an increase in workload; however, 57% indicated that TBL increased their enjoyment of teaching. While 62.5% indicated that the transition to TBL was difficult, the same percentage felt that they would use it in other courses. Faculty members (62.5%) indicated that student participation increased due to TBL in this class. The main limitation was the small sample of faculty that utilized TBL in this course, but the survey will be administered over multiple semesters to more thoroughly engage both new faculty in the course, as well as faculty who have taught the course for multiple semesters.

Future Work

The initial data collection using the survey tool provided a snapshot of faculty perception after one semester of TBL implementation in PP2120. The data established an effective baseline of perception that faculty workload increased during the first semester that the course was taught.

The continued aim is to collect data over a 3 year (6 semesters) period of time to evaluate how faculty members perceive TBL and their corresponding workload after multiple semesters in the same course. Longitudinal evaluation may show why an evaluation of the faculty and assessing specific variables is important, as opinions of TBL may change over time and workload may normalize. Monitoring this data over several semesters may also show the natural changes in attitudes over time. Therefore, future implementers of TBL can have an idea of which variables may or may not improve over time so adjustments can be made appropriately.

Using Data from Faculty Evaluation

Faculty evaluations can be used internally to understand and address issues based on the comments of the faculty. A course coordinator can modify the approach of TBL to ensure student engagement remains the same or is improved. For instance, there may be a better approach to query and answer the muddiest points after completion of the readiness assurance tests. Also, if faculty felt they were not adequately trained on the philosophy and implementation of TBL, more time or a different approach to educating the faculty can be utilized. Evaluations may also give insight to either the individual's perception of TBL or how well TBL worked for a particular course. Faculty may feel it may be a suitable way to deliver material in a certain course, but they may have concerns on using this method in other courses. Although it cannot be determined who made specific comments as the results are de-identified, general improvements can be made in subsequent semesters. For instance, faculty evaluations can be utilized by administration to assess whether workload adjustments need to be addressed for future semesters. Finally, this data can be used for other course coordinators who are looking to incorporate TBL in their course, ensuring the faculty are not overloaded (especially the first year of implementation) as the pre-reading, tests, and emphasis may need to be updated. Many faculty have responsibilities in teaching topics over multiple courses, and their perception of utilizing this technique in other courses may be beneficial.

Summary

Understanding the importance of a faculty's perception towards a new teaching approach is crucial. This knowledge can help ensure faculty: understand this different approach, have a say in the use and implementation, consider necessary changes in workload, and confirm that examples from the

literature are generalizable to their institution, course, and topic. Surveying faculty, particularly over time, may be helpful for identifying future changes and considerations in TBL at an institution using TBL.

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Table 1: Questions for Faculty Evaluation of Team Based Learning

	Question	Answer Choices
1	Compared to traditional lecture in this course, TBL student participation _____.	-Dramatically increased -Slightly increased -Did not change -Slightly decreased -Dramatically decreased -Not applicable
2	Compared to traditional lecture in this course, TBL _____ the interaction I had with students.	
3	Compared to traditional lecture format, using TBL _____ my enjoyment of teaching.	
4	Compared to traditional lecture in this course, TBL _____ my workload.	
5	Compared to traditional lecture in this course, TBL _____ the number of course-related meetings in which I needed to attend.	
6	Adjusting to a TBL course approach from traditional lecture was difficult.	-Strongly agree -Slightly agree -Neutral -Slightly disagree -Strongly disagree
7	I was given adequate training in TBL prior to utilizing it in the classroom	
8	After teaching TBL in this course, I would like to teach using TBL in other therapeutic-series of courses (eg. Therapeutics, Pathophysiology)	
9	After completing this TBL course, I would like to teach using TBL in other non-therapeutic-series of courses (eg. Advanced Pharmacy Practice, Introduction to Pharmacy Practice)	