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Experiences in Teaching and Learning

## Student preparation time for traditional lecture versus team-based learning in a pharmacotherapy course

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## ABSTRACT

**Background and purpose:** Determine how much time students spent preparing for traditional lecture versus team-based learning (TBL) for a pharmacotherapy course and determine if time spent in each pedagogy was within stated expectations for the course.

**Educational activity and setting:** Instructors used a combination of traditional lecture and TBL to deliver material. Before each lecture, instructors recorded the amount of time students spent preparing for each method using a one-question clicker-response survey.

**Findings:** Instructors delivered 16 hours of TBL, 32 hours of traditional lecture, and eight hours of a mix of TBL and traditional lecture. The median of students completing the survey each week was 89. A large percentage of the class (40.9%) did not prepare for traditional lecture while only 3.4% did not prepare for TBL. About 61% of students spent between 30 min and two hours preparing for a two-hour TBL session and only 10% spent more than three hours preparing.

**Discussion and summary:** Results of this project show students spend little time preparing for traditional lectures without in-class accountability, which may give students the perception that TBL requires too much preparation time.

## Background and purpose

Team-based learning (TBL) is a teaching strategy that involves pre-class preparation, in-class readiness assurance testing, and application-focused activities.<sup>1</sup> Further, TBL is a team-oriented process that requires active participation in the classroom as opposed to passively listening to lectures. Pre-class preparation shifts the learning of factual content outside of the classroom and allows for integration of previously learned knowledge with new learning in the classroom. TBL is associated with several benefits for student learning and is, therefore, utilized in a variety of healthcare disciplines, including medical, nursing, and pharmacy schools.<sup>2</sup> Teaching methods that utilize active learning, such as TBL, may continue to increase within pharmacy curriculum because incorporation of active learning strategies is part of the accreditation standards for doctor of pharmacy programs.<sup>3</sup>

TBL was not routinely utilized as a method of teaching and learning at Concordia University Wisconsin School of Pharmacy (CUWSOP) prior to 2015. The majority of students received minimal exposure to TBL prior to their required third-year, four-credit, fall-semester pharmacotherapy course. Pharmacotherapy IV is the fourth of five courses in the series. The course content includes the clinical presentation, pathophysiology, epidemiology, and treatment of certain oncologic, pulmonary, psychiatric, neurologic, and pain disorders. Each class period is two hours long and the class meets twice per week. TBL is incorporated into each of the five units of the semester-long course, but each instructor determines whether content will be delivered via TBL or traditional lecture based on

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their personal teaching preferences. Some instructors choose to deliver all their content via traditional lecture only, some via TBL only, and some alternate their teaching between TBL and traditional lecture. Therefore, students in this course participate in a mixture of traditional lecture and TBL sessions. A common complaint on course evaluations and TBL surveys is the amount of time it takes for students to complete the pre-class assignments.

TBL has been successfully implemented into pharmacotherapy courses within pharmacy curriculum but there are several potential hurdles to overcome.<sup>2,4-6</sup> One potential barrier is the amount of time it takes students to complete self-study materials prior to class.<sup>7</sup> Pre-class assignments may include textbook readings, journal articles, prerecorded lectures, and/or instructor-prepared materials. Extensive pre-class preparation may be required for more complex topics or for content that requires long periods of time in the classroom. Instructors may underestimate the time it takes students to learn new and complex material outside the classroom, leading to student frustration.<sup>2</sup>

Students describe a higher workload with TBL compared to traditional lecture.<sup>2,7</sup> Students may view the preparatory work as unnecessary, an intrusion on their time, and competitive with time to study for other courses.<sup>5,8,9</sup> These views may impact student buy-in with the process, which is important for effective implementation and continuation of TBL within a course.<sup>10,11</sup> Therefore, instructors need to find a balance between the pre-class material assigned and the amount of time students actually have for preparation.<sup>2</sup> Instructors should set limits on materials assigned for pre-class preparation and implement a process to identify when these limits are exceeded.<sup>7</sup> However, the current literature lacks information on how much time is considered acceptable or practical for pre-class assignments.

Preparation time for TBL is included in the total out-of-class time students should spend on a course. The credit hour is the standard used today by most universities to determine the total amount of time students should expect to spend in class and out of class preparing for class, completing assignments, and studying for examinations. This standard originated with the Carnegie unit (also known as the credit hour) in 1906, and is still in use more than 100 years later. Some experts believe this standard is outdated, and not in congruence with outcomes-based curricula in the technology age.<sup>12,13</sup>

According to this standard, for a two-hour classroom session, students should spend about four hours outside of class for preparation and study. However, findings from the Social Science Research Council's Collegiate Learning Assessment longitudinal project<sup>14</sup> show the average 12-credit student, with the minimum expectation of 24 hours per week of outside study, reported only studying about 14 hours per week. This research suggests today's college students typically spend less time studying outside of class than recommended.

The literature lacks information on whether pharmacy students spend an excessive amount of time preparing for TBL compared to traditional lecture, or if they view TBL preparation as excessive because they are used to spending little to no time preparing for traditional lecture. Therefore, the objectives of this project were to determine how much time students spent preparing for traditional lecture versus TBL for a pharmacotherapy course and determine if time spent in each pedagogy was within stated expectations for the course.

## Educational activity and setting

The coordinator and faculty for this course used a university-wide credit hour policy to set the expectation that students should dedicate about 12 hours per week to the course: four hours of in-class time, and eight hours for outside of class preparation and/or study of material. This expectation was discussed verbally with students on the first day of class but they were not given a specific definition of "preparation" or guidance on what types of activities typically constitute preparation time. For each two-hour TBL session, faculty required viewing of pre-recorded lectures that ranged from 17 to 83 min, with or without a short assignment or reading (Table 1). For traditional lecture, faculty most often required readings that ranged from 7 to 51 pages, with or without a short assignment (Table 1). Students were not provided with additional materials, like faculty-created study guides or note packets. Students were verbally informed they were expected to complete required materials prior to coming to class but the level of accountability varied depending on the format of the class (TBL versus traditional lecture).

### TBL implementation

At the beginning of the semester, students completed The Health Professionals' Inventory of Learning Styles (H-PILS)<sup>15</sup> survey to determine their dominant learning style (accommodator, assimilator, converger, diverger). The course coordinator used this information to create the TBL teams. The course instructors thought the teams would more likely approach the in-class learning activities from different angles if a variety of learning styles were involved. Instructors also hoped the students would learn to work better with others who approach and solve problems in a different manner. However, about half of the teams only consisted of students with two different learning styles because the majority of students in this cohort were assimilators. There were 17 total teams and each team consisted of five to six students.

The readiness assurance process consisted of an individual readiness assurance test (IRAT) and a team readiness assurance test (TRAT). The IRAT and TRAT were only used to assess student pre-class preparation for TBL activities and were not used to assess preparation for traditional lectures. Each IRAT consisted of 10 multiple-choice questions that were delivered in an electronic format. Students had to individually complete it within 10 min but were permitted to use a one-page, self-created, handwritten study guide. The quiz questions were written based on the learning objectives for each session and most often covered the knowledge and comprehension levels of Bloom's Taxonomy. Students could not see their scores after the IRAT was completed. The TRAT consisted of the same 10 multiple-choice questions but students were allowed 15 min to complete it with their team members. The TRAT was

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