

Transitioning to team-based learning in clinical pharmacology significantly improves students's self-confidence

Authors: Filip Siska | Jitka Rychlickova | Lenka Souckova | Regina Demlova |

Organization: Department of oncology, Hospital of Ceske Budejovice and Department of pharmacology, Faculty of Medicine, Masaryk university

Abstract:

Introduction: Team-based learning (TBL) represents an active and collaborative approach emphasizing critical thinking, knowledge application within clinical contexts. This methodology implements flipped-classroom elements (individual pre-class reading, watching video-recording, testing knowledge gained). The collaborative part follows a three-step process: readiness assessment tests (individual and group), virtual patients, and a final discussion focused on the highest levels of Bloom's taxonomy. While TBL is gaining recognition in medical education, there is limited data on its effectiveness in CPT. **Objectives:** The aim is to present the transition of the CPT course from a traditional format to a flipped classroom and TBL and demonstrate its effectiveness. **Methods:** A voluntary questionnaire was distributed to students taking the CPT subject at the end of the past two academic years. The questionnaire utilized a five-point Likert scale to gauge confidence levels in various aspects: medication review, prescription writing, assessment of dose adequacy regarding elimination functions, treatment reasonability, avoidance of duplications, and identification of adverse effects and drug interactions. Statistical analysis was conducted using Statistica 12®, employing a two-sample t-test to ascertain mean differences. Key statistical parameters, including the t-statistic and p-value ($p < 0.05$), were generated to assess the outcomes. **Results:** The journey of transformation began in 2020 when the primary format was a traditional lecture interspersed with interactive elements and short whole-group discussions. The COVID-19 pandemic reinforced the need for greater student engagement, a shift from knowledge transfer to skills development. We defined key topics and skills based on essential medicine lists, medication errors, and our own clinical experience. Based on this structure, a set of 15 chapters of pre-class readings was built, augmented with application exercises and questions to test input and acquired knowledge. In the next phase, the pre-class reading was enriched by video-lectures. Finally, all were brought together on a newly designed learning platform, allowing for a complete flip of the classroom. In the next phase, RAT tests, virtual patients were prepared. In the meantime, the nature of the final assessment was adapted continuously. It was a 5-year adventure culminating in the full implementation of the flipped classroom and TBL last semester, fostering a more participatory and inclusive learning environment. Fifty and forty-one students answered the survey in 2022/2023 and 2023/2024, respectively. No statistical significance was observed in pre-course knowledge confidence between students, indicating a similar baseline in general pharmacology. However, students exposed to TBL demonstrated heightened confidence in conducting medication reviews (3.2 ± 0.7 vs. 3.8 ± 0.8), assessing medicine reasonability (3.7 ± 0.7 vs. 4.1 ± 0.7), prescribing (3.1 ± 0.7 vs. 3.7 ± 0.9), evaluating drug dose adequacy (3.0 ± 0.9 vs. 3.6 ± 1.0) and potential drug-drug interactions (3.4 ± 0.8 vs. 3.8 ± 0.9). Notably, no statistical significance was found in determining medication duplications and assessing possible adverse effects. **Conclusion:** The above example describes the gradual introduction of the flipped classroom and collaborative learning and demonstrates its effectiveness. Although only through subjective evaluation, as the objective ones are not available yet. The timeline and definitions of the sub-steps illustrate further practical aspects of the transition.