Team-Based Learning Analytics: An Empirical Case Study

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AIM

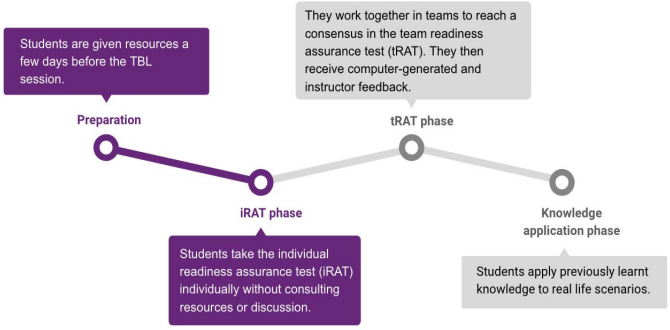
To demonstrate how LMS-generated and recorded data can be used to investigate issues in the real education environment.

BACKGROUND

Many medical schools that have implemented team-based learning (TBL) have incorporated a learning management system (LMS). LMS is a powerful tool that can be used to analyse learners' performances. This study illustrates how LMS was used to analyse the factors behind a particular team's poorer performance in TBL.

INTRODUCTION

TBL is an active learning strategy that is learner centred but instructor led. It comprises of the following 4 phases.

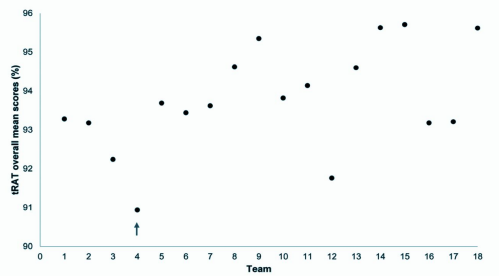


An LMS is an online application that assists instructors in facilitating TBL by allowing instructors to guide students through the TBL process as well as assessing the performance of the students. Additionally, LMS can be used to collect data from students' performance to allow in-depth analysis of their learning progress.

In this case study, LMS was used to identify a team that performed poorly during TBL and analyse the factors behind their poor performance.

ANALYSIS

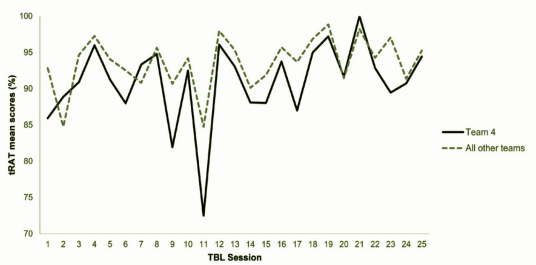
Analysis 1: Can we identify a significantly weaker team?



The mean tRAT scores for all 25 TBL sessions for each term were gathered. The overall mean tRAT score of the class was 93.8% and scores below 91.1% (below 2SD) were considered significantly lower. Team 4 which has a mean tRAT of 90.9% is statistically significantly weaker.

ANALYSIS

Analysis 2: Is the weaker team consistently performing more poorly throughout the module?



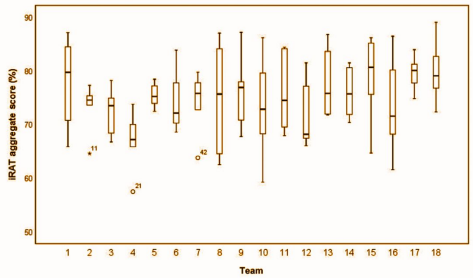
We analysed the tRAT scores for Team 4 across 25 TBL sessions and compared it with that of the 17 other teams for each session as seen in Fig 2. We noticed that Team 4 had generally lower tRAT scores (TBL sessions 2, 7 and 21), hence showing a weaker tRAT performance.

Analysis 3: Are students in Team 4 generally weaker academically?

We decided to investigate whether Team 4 was accidentally composed of students who were weaker academically. Extensive planning goes into team composition, with teams grouped based on their BMAT, MMI, and examination scores in year 1. Using SPSS software, we conducted 4 ANOVA tests and detected no significant differences on the 4 measures among the teams.

- BMAT; $F = 0.84$, $P = .64$
- MMI; $F = 0.89$, $P = .59$
- Examination 1; $F = 0.55$, $P = .92$
- Examination 2; $F = 0.28$, $P = .99$

Analysis 4: Are students in Team 4 preparing less for class?



This shows a bow-and-whisker plot for each team, with the thick line in the box indicating the median. Team 4's median score was not that much lower, but they had an outlier with the lowest iRAT mean score (on average 57.5%). This means that one student did not perform well, pulling the team mean downwards.

DISCUSSION

LMS-generated data was able to give us valuable insights on students' learning progress by identifying how *one* individual student was able to affect the performance of Team 4. Interestingly, LMS data was also able to provide insight into the effectiveness of TBL as all teams showed an increase in mean tRAT score compared to mean iRAT score.

CONCLUSION

This case study provides just one example of how LMS data can be used in TBL. Institutions can use LMS data to make informed decisions on interventions to help students learn to form the basis of evidence-based educational decision making.

To watch the presentation, please click on the video below: