

# Effect of Seating Arrangement on Class Engagement in Team-based Learning: A Quasi- Experimental study

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## Introduction

### Abstract

This study investigated the effects of seating distance and orientation on engagement in novice and experienced learners in a large classroom explicitly designed for team-based learning (TBL). The goal was to find out what affects TBL engagement, in order to improve its implementation

### Seating arrangement and engagement

Existing literature suggests that semicircular classroom designs allow for more comfortable engagement between students and tutors which led to better learning for students compared to traditional row and column classroom organisation.

### Team based learning

TBL use is increasingly popular in medical education, with positive outcomes in many areas. It works by increasing students' cognitive engagement via participation, discussion and processing of information, which subsequently affects achievement.

A TBL session comprises 3 phases: preparation, readiness assurance, and application exercise phase. This study was conducted at Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore, which uses TBL as their main pedagogical method for the first 2 years of medical undergraduate learning.

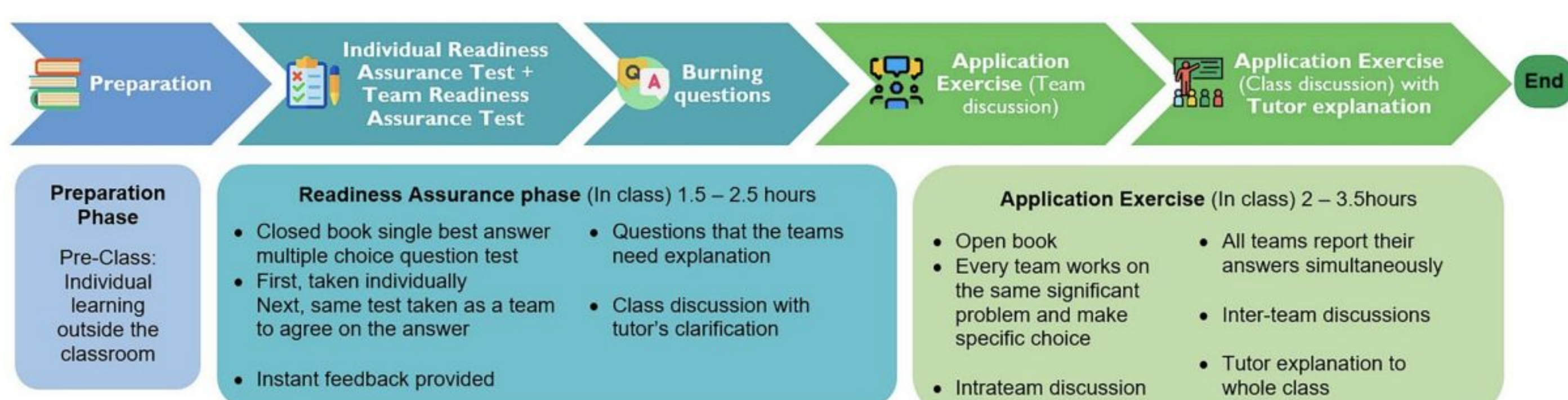


Fig. 1: Schematic of a typical TBL process from Preparation to Readiness Assurance, Burning Questions, and Application Exercise phase at the Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore. Descriptions about what each phase entails and their average duration are included. TBL procedures described here may vary between institutions

In this study, we aimed to investigate 2 factors associated with seating arrangement:

- The effects of seating distance from the tutor on class engagement in TBL
- If the direction students are facing affects class engagement in TBL.

The hypotheses are (1) sitting nearer to the tutor results in higher engagement and (2) sitting with their front-facing the tutor results in higher engagement.

## Results

- In novice group, mean SCEM score decreased in those who moved further away (3.30 to 2.98,  $p=0.02$ ) and overall (3.26 to 3.00,  $p=0.004$ ). No significant change in other groups.
- In novice group, mean CES score decreased in those who moved further away (3.38 to 2.91,  $p=0.009$ ). No significant change in other groups.
- There were no significant change in SCEM and CES scores between those front facing tutor and those back facing tutor.
- Two-way ANOVA was performed to assess the interaction between seating distance and orientation which was not statistically significant.
- Rating on a scale of 1 to 5, novice students preferred sitting nearer to the tutor (mean = 3.45 vs 2.53,  $p<0.001$ ), while experienced students have no significant difference.
- Both novice (mean = 4.20 vs 3.56,  $p=0.001$ ) and experienced (mean = 4.21 vs 3.62,  $p=0.003$ ) students prefer to sit facing tutor.

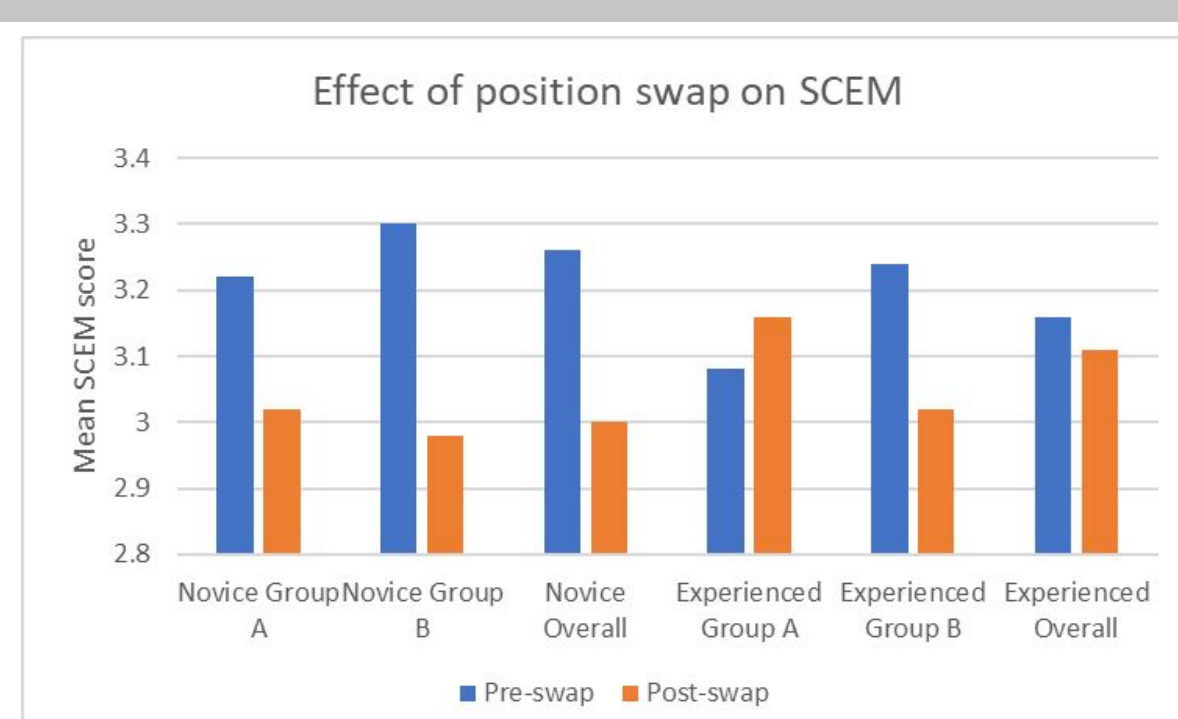


Fig. 3: Mean SCEM score in novice and experienced groups pre-swap and post-swap. Group A moved closer to tutor, Group B moved further away from tutor.

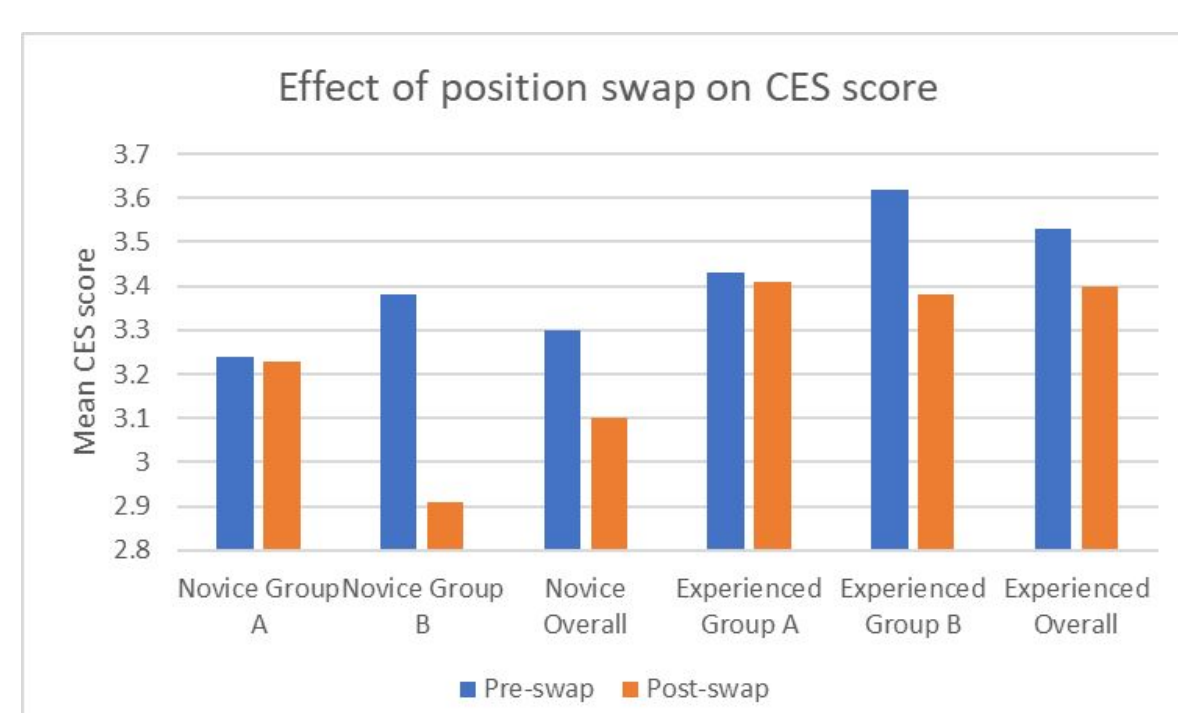


Fig. 4: Mean CES score in novice and experienced groups pre-swap and post-swap. Group A moved closer to tutor, Group B moved further away from tutor.

## Discussion

Overall, student engagement was not significantly affected by seating distance nor orientation with respect to the tutor.

- Novice students displayed a stronger preference to sit nearer to the tutor compared to experienced students.** This can be attributed to novice students being inexperienced with the TBL pedagogy, thus any significant change from prior experiences will influence how they pay attention in class. Increased exposure to TBL allows experienced students to acquire skills which compensate for any minor disturbances in their learning environment.
- Both groups preferred to sit with their front-facing the tutor.**

## Methods

### Study design

Students were assigned to teams of 5–7. The classroom design includes a circular layout, six big screens around the periphery of the room and chairs with wheels around fixed tables. Tutors were situated in front. Engagement was assessed at two points: 'Burning Questions' and 'Application Exercise' phase. The intervention involved rearranging the students' seating layout and collecting data before and after this swap (Fig 2)

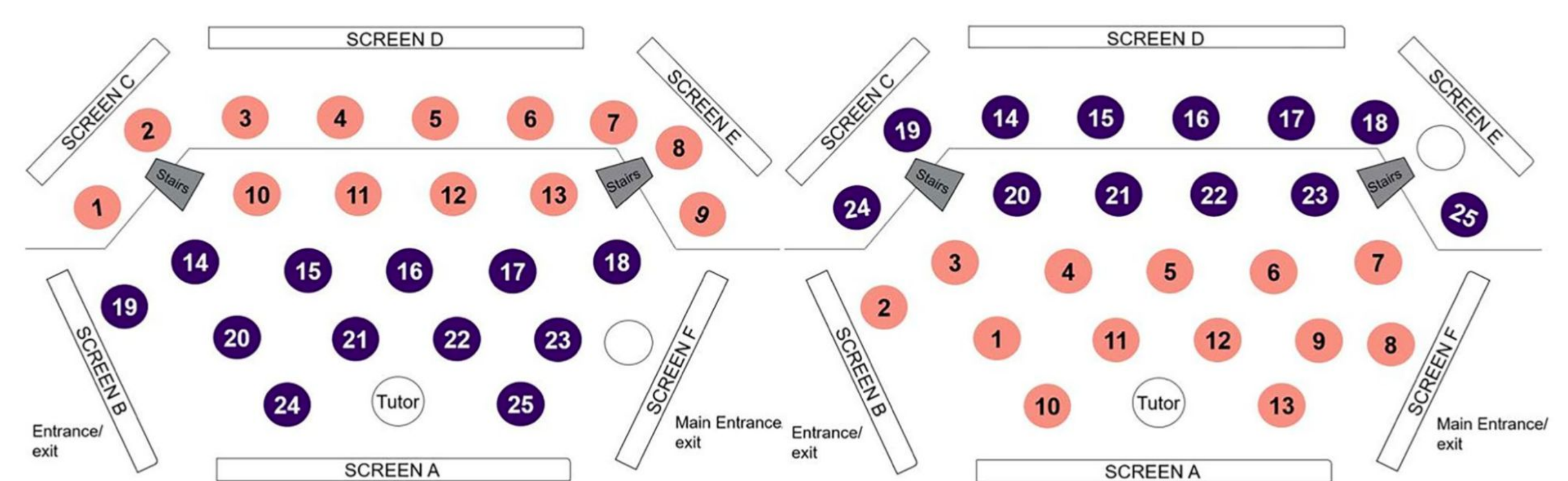


Fig 2.: Classroom seating arrangement. Left: Original seating position before swap. Right: Seating arrangement after swap

### Participants

One hundred and fifty first-year and 138 second-year undergraduate medical students were recruited with 85 and 75 responses collected respectively.

### Assessing Cognitive Engagement

TBL engagement was evaluated using two self-reporting instruments.

Firstly, the Situational Cognitive Engagement Measure (SCEM) is a 5-point Likert scale 4-question survey that captures cognitive engagement of the ongoing activity at that instance.

Secondly, the Classroom Engagement Survey (CES) is a 5-point Likert scale 8-question survey retrospectively assesses overall engagement of the class

Lastly, open-ended response questions were provided to further qualitatively explore students' preferences with seating arrangement and engagement.

To compare pre- and post-swap groups, independent samples *T*-test was conducted to assess both the effects of seating distance and seating orientation on engagement.

## Discussion (2)

### Practical Implications

While students displayed a preference to sit nearer or face the tutor, they can overcome such physical inconveniences and feel similarly engaged at their less ideal spot.

- Medical students generally have higher motivation levels, allowing them to adapt to different seating arrangements.
- Tutors are relatively less involved in the learning experience, hence, distance from them plays a less significant role in learning.
- Well-designed learning spaces allow students to fully utilise their environment and assists them in adapting to less preferred seating arrangements.

### Limitations

- All TBL sessions differ in characteristics such as topic, length, student fatigue and tutor variation.
- TBL population consists of student populations other than medical students which this study is based upon.
- No control group where students did not change seats.
- Less survey responses after the swap which may affect reliability of study results

## Conclusion

There were no significant effects of seating distance or orientation on TBL engagement, despite a preference for novice students to sit near their tutor. Both experienced and novice students had a strong preference to sit with their fronts facing the tutor. Compared to experienced students, novice students were more affected by changes in seating arrangement, who may showcase their need for early psychological safety.

The specially designed classroom was an important reason students felt unaffected by seating arrangements. The findings reassure us that, with proper attention to the physical space, students are not at a disadvantage from their seating arrangement, which supports utilising specialised active learning classrooms for TBL.