Using Competitive Learning to Increase Student Engagement

David C. Anastasiu and Gheorghi Guzun

Introduction

- Objective: Improving student motivation, engagement and performance through competitive active learning.
- Why?:
  - To motivate students to think outside-the-box.
  - To increase student participation.
- How?:
  - By creating an online tool, called Competitive Learning Platform (CLP).

Research Questions

- Do students feel comfortable and have a positive attitude towards a competitive active learning approach?
- Through competitive active learning, are students encouraged to innovative and try different solutions?
- Does competitive active learning have a significant impact on student performance?
- Does student performance depend on how engaged/active they are in the class?

Components of Particular CLP Dashboard:

- leaderboard with the top three current scorers in the class plus their best score and rank,
- a graph displaying the class score distribution, 
- a graph displaying the trend of personal submissions, and
- a table containing all the submissions of the student and corresponding scores.

CLP provides an option to not display the competition leaderboard to reduce potential stress.

Experimental Results

- Through competitive active learning, are students encouraged to innovative and try different solutions?
- Does competitive active learning have a significant impact on student performance?
- Does competitive active learning have a positive attitude towards a competitive active learning approach, or do they feel that it is demotivating?
  - Mean sentiment of most students is positive.

Experimental Results

- Do students feel comfortable and have a positive attitude towards a competitive active learning approach, or do they feel that it is demotivating?
  - Mean sentiment of most students is positive.

Experimental Results

- Does competitive active learning have a significant impact on student performance?
  - Aid student performance by encouraging them to engage more in learning activities.
  - As a student engages more, they will perform better.
  - Pearson correlation coefficient between the average number of submissions and student best scores, score improvement, and grades.
  - The number of submissions is a strong indicator of performance improvement over the life of the assignment, denoting strong student engagement in the course.
  - Does student performance depend on how engaged/active they are in the class?

Class Best Score Improvement Grade
Homework-1 0.419347 (33) 0.827656 (33) 0.314100 (33)
Homework-2 0.321742 (38) 0.576598 (38) 0.274715 (38)
Homework-3 0.354773 (37) 0.578663 (37) 0.375896 (37)

Fig 10: Average Submission Correlation for CMPE 255

- Encourage thinking outside-the-box.
- Majority of students saw competitive assignments as a positive addition to the course curriculum.
- Does competitive active learning have a significant impact on student performance?

Fig 11: Average Submission Correlation for CMPE 255

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Fig 12: Submission Span Score and Daily Engagement Distributions

- High engagement score values indicate continued student engagement.
- High submission span score values indicate higher improvement in score and thus increased performance.