

# A Completed Flipped Classroom with close individual tutoring

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## Teaching Arrangements

Professor Sidharth implemented flipped classroom methods in a compulsory course for freshmen (ENGG 1410C Engineering Mathematics I) in the second semester of 2014-15.

## Features

Prof. Sidharth has always wanted an interactive and active mode of teaching, and he has the hope that flipped classroom methods would make significant changes to the teaching and learning environment in his course. The course has the following features.

Before class students are required to watch videos and read textbooks through an online learning platform ([Piazza](#)), in order to understand the logic and concepts on the subject. Piazza and Google Hangout are implemented as learning and communicating platform between students and teaching staff.

Class time is spent on doing exercises, discussion, and presentation. Each study group is composed of 3 students. They discuss to finish 3-4 questions in the 2 hours' class time. Students finishing fast are selected to explain their answers to the whole class. The teacher and TAs walk around in the classroom and support students immediately when needed.

Students are divided into 4 tutorial groups. In each group the tutor records each students' performance in exercise and help the student to solve difficulties and improve.

30% of marks record students' attendance and participation by finishing in-class exercises, presentation, and bonus questions in Piazza.

## Students' Feedback

### *Advantages*

- Students benefit most from the enriched engagements and interactions. Since in-class exercises are done with TAs' close support, class becomes tutorials.
- Learning initiative is nurtured. Students think preview can be very helpful to learning after attending this course.
- Students learn more than in traditional classroom by teaching classmates in group study, by search more resources online, and by taking more initiative for learning.

### *Disadvantages*

- Students are polarized into two groups. Capable students become more capable, and less capable students face more difficulties in learning.
- Students feel difficult to communicate in group study. For example, some students may still say in confusion after the teammate explains a problem for a long time.
- Watching videos costs too much time.

**Improvement**

- Improvement is continuous as TAs accumulate feedback from students every week.
- A short lecture is provided before class to students who have difficulties learning by watching videos.
- Grading policy was revised so that students can gain the 30% by participating in diverse teaching activities.