

CLASS METAMORPHOSIS – FROM TRADITIONAL TO FLIPPED TO SELF-PACED LEARNING

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Highlights: Within the traditional learning environment, students might be left out unintentionally especially the struggling ones. The top students tend to get most of the attention in a lecture taught in a traditional model. Also, it is compulsory to cover specific contents in the courses and this requirement might hinder the implementation of active learning. With the access to the Internet, learning can be done outside of classroom. Our team changed the classroom setting to active and cooperative learning in our Numerical Methods and Optimization course. All instructional materials are made available in the UMP online platform known as KALAM as early as the first day of the new semester. Assessment schedule is also provided for the students to plan their learning activities. This approach drastically improves students' attainment, not only in terms of grade but also their related soft-skills.

Keywords: *Flipped classroom, self-paced learning, active learning, classroom management*

Introduction

Traditional learning environment is commonly found in any higher learning institutions. It can be regarded as a one-way learning session where students are passively involved and worked by themselves. Normally, collaboration is discouraged in this environment because the focus is given more towards the lecturers. Although it may encourage independent skill, students do not have the opportunity to collaborate with others student and that may affect their communication skill (Benware & Deci, 1984). For that reasons, active learning is highly encouraged as the platform for students to improve all the important soft skills before they enter the industries.

Many models have been presented in the literature for active learning and how to engage the students. However, no single accepted model has been established in the chemical engineering courses. That is apparent in the mathematical-based courses, including Numerical Methods & Optimization. This course is scheduled to be taken by the second-year students in the Faculty of Chemical & Natural Resources Engineering (FKKSA), Universiti Malaysia Pahang (UMP). The traditional learning environment of this course was transformed into a flipped classroom (FC) setting in 2012/2013 (Zainol & Samah, 2018). The term flipped classroom is commonly used for any class in which pre-recorded videos are used for learning activities. The magic in a flipped classroom is in the overall approach—the integration of videos with new applications of class time (Bergmann & Sams, 2012). The pre-recorded videos are combined with in-class activities alongside others integrated elements of technology. The learning environment for this course further evolved into a self-paced learning (SPL) session in 2018/2019. The execution of SPL does not differ much from that of FC—only the face-to-face contact time is reduced.

At the point of the transformation, mixed feedbacks were received and most inclined to the Delta side in a Plus-Delta feedback format. Nonetheless, the grades obtained by the students enrolled in this course — more than 98% passed with minimum B — reflect the success of the new learning environment because the role of the instructors of this course has changed from lecturing to facilitating and the attention has shifted to the students who need the most assistance, without ignoring the top students.

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References

- Benware, C. A., & Deci, E. L. (1984). Quality of Learning With an Active Versus Passive Motivational Set. *American Educational Research Journal*, 21(4), 755–765.
- Bergmann, J. & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day*. Washington DC: International Society for Technology in Education.

Zainol, N. & Samah, R. A. (2018). The Implementation of a Flipped Classroom Methodology to The Subject "Numerical Methods and Optimization" of Chemical Engineering Degree at The Universiti Malaysia Pahang, 2nd International Conference on Science, Technology, Engineering and Mathematics Education 2018 (ICSTEM 2018), Kuala Lumpur.