

# Chapter 8

## Navigating Engineering Education Amidst the Post–Pandemic Era: Enhancing Engineering Education Through Blended Learning With a Flipped Classroom Approach


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### ABSTRACT

*This study explores the challenges and opportunities in engineering education arising from the post-pandemic landscape. In response to the evolving educational paradigm, the research focuses on the implementation of a blended learning model with a flipped classroom approach to enhance the effectiveness of engineering education. The study employs empirical methods to assess the impact of this pedagogical shift on student engagement, learning outcomes, and overall educational experience. The investigation involves the integration of traditional face-to-face instruction with online resources and interactive digital content. The research mainly evaluated the efficacy of the blended learning approach with flipped classroom approach.*

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*Preliminary findings suggest that the adoption of blended learning with a flipped classroom approach positively influences student learning outcomes, fosters a more dynamic and participatory learning environment, and addresses the challenges posed by the post-pandemic educational landscape.*

## **INTRODUCTION**

The COVID-19 pandemic has triggered a transformation in educational practices worldwide. Education extends beyond traditional classroom teaching and encompasses various types and functionalities. In an effort to define education, this chapter emphasizes the importance of efforts aimed at enhancing student's knowledge and principles through blended learning with a flipped classroom approach to help them reach their full potential. This understanding of education resonates with the approaches taken by Universiti Tenaga Nasional UNITEN (Malaysia) in structuring the engineering education system to better serve the students.

In Malaysia, the education framework prioritizes universality, ensuring that all university students have access to the institution system. The Malaysian model follows the 7 semesters + 1 structure, with seven semesters of mandatory on campus education, followed by one semester of practical training.

However, the traditional educational learning method had to be re-structured from physical to virtual learning due to the emergence of the COVID-19 pandemic which marked a significant upheaval globally. The coronavirus, with its diverse symptoms ranging from mild cold-like symptoms to severe respiratory distress or pneumonia, was first reported by the World Health Organization in Wuhan, China, on December 31, 2019. Subsequently, the virus spread worldwide, including Malaysia. Malaysia recorded its first case on January 25, 2020, and subsequently experienced fluctuating trends in COVID-19 cases and associated policies. The pandemic necessitated a paradigm shift in education as higher learning institutions transitioned from physical to virtual modes of learning. In Malaysia, education remains predominantly online, with intermittent attempts to resume in-person learning amid rising cases. However, uncertainties persist regarding future educational protocols and procedures to mitigate virus spread.

The shift to online learning had presented challenges for both students and instructors. Issues such as limited internet access and technological resources hinder effective online learning. Instructors also struggled with adapting to technology and adjusting assessment methods. However, efforts have been made by the government and university management to address these barriers and enhance the effectiveness of online learning amidst the ongoing pandemic.

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