Chapter 7
Running a Successful Practice School: Challenges and Lessons Learned

Hong-ming Ku
King Mongkut's University of Technology, Thailand

Saranya Thonglek
University of Queensland, Australia

ABSTRACT

The Chemical Engineering Practice School (ChEPS) at King Mongkut's University of Technology Thonburi (KMUTT) in Bangkok is a two-year international curriculum modeled after Massachusetts Institute of Technology's School of Chemical Engineering Practice. The aim of this Master's program is to produce professional chemical engineers with strong fundamentals, practical experience, and a good command of English. The program's uniqueness lies in its strong linkage with the industrial sector. This chapter contains a history of ChEPS and details how KMUTT operates the program. The key factors contributing to the success of the program are identified. Moreover, critical analyses gleaned from the faculty, the alumni, and the industrial sponsors are carried out to examine the current strengths of ChEPS and to identify areas for improvement. Key challenges still facing the program are also outlined. Finally, potential solutions to these challenges are recommended.

INTRODUCTION

The traditional method of learning in engineering disciplines involves classroom lectures, homework assignments, and laboratory work. Although this training is effective to a certain extent, there exists a gap in the skill set needed of students when they step into the real world. This is particularly true in Southeast Asia including Thailand, where education has traditionally been more tightly structured and teacher-directed (Ziguras, 2001). Rote learning is usually the norm, and creative thinking

DOI: 10.4018/978-1-60960-547-6.ch007

is often overlooked. *Spoon-feeding* is prevalent in classrooms even at the college level. As a result, engineering graduates in Thailand generally do not possess strong analytical and problem-solving skills. To compensate for the deficiencies in the educational system, companies are often forced to invest substantial resources on re-education and on-the-job training for starting engineers.

In addition, the English proficiency of Thai engineering students is on the average subpar. In today's global economy and with a substantial foreign investment totaling billions of dollars annually in Thailand, the importance of English cannot be overemphasized. Unfortunately, English takes a backseat in most engineering curricula. Students have very limited exposure to English, and there is little incentive for them to improve, as most programs do not have a minimum English requirement for graduation. Finally, companies often complain about the inadequate training of university graduates in communication, be it spoken or written, even in their native language. These facts are hardly surprising, given that nearly all graduate programs are taught in Thai with little emphasis on technical writing and oral presentations.

King Mongkut's University of Technology Thonburi (KMUTT) is an autonomous state institution in Bangkok with a long tradition in engineering. As early as 1996, the university recognized many shortcomings described above in its engineering programs. Shortly after, KMUTT introduced an initiative to develop a new flagship practice-based curriculum aimed at overcoming these deficiencies. The objective was to produce well-rounded engineers who possess strong technical expertise, can communicate effectively, and have good English proficiency. If proven successful, the goal was to expand the initiative to include other curricula. KMUTT chose Chemical Engineering to be the pilot program. The new curriculum called the Chemical Engineering Practice School (ChEPS) was founded in 1997 and modeled after Massachusetts Institute of Technology's (MIT) David H. Koch School of Chemical Engineering Practice. ChEPS is a two-year international master's program with one semester of compulsory industrial internship or practical training.

The practice school can be viewed as one model of Work-Integrated Learning (WIL), which can be broadly defined as educational activities that integrate theoretical learning with its application in the workplace. This learner-centric process should provide a meaningful experience of the workplace application, resulting in successful learning outcomes such as problem-solving skills, creative thinking, and other soft skills for the student. WIL models include (but are not limited to):

- Practical training via practice schools
- Internships
- Work placements
- Cooperative education
- Industry-based learning
- Community-based learning
- Student group projects

The essence of a practice school is to supplement traditional classroom learning and "instructionism" with practice-based learning (PBL) and "constructionism", which together can be succinctly described as "learning by doing." This learning takes place at industrial sites in a real work environment where students are trained to solve real-life problems. In the practice school, this practical training is an integral and compulsory part of the curriculum and earns credit hours for students to fulfill their graduation requirement.

Practice-based learning is a new pedagogy and has been found highly effective for teaching science and engineering. In higher education, well-organized PBL can tremendously benefit the three primary stakeholders, namely the university, the student, and the industry. With practice-based curricula, the university fosters strong ties with industry and is able to graduate engineers with robust skills and practical experiences. On the

A Comparison of the CDIO and EUR-ACE Quality Assurance Systems
Johan Malmqvist (2012). *International Journal of Quality Assurance in Engineering and Technology Education (pp. 9-22).*
www.irma-international.org/article/comparison-cdio-eur-ace-quality/67128