

# 11

## **INDUSTRY PERCEPTION OF UTM CHEMICAL ENGINEERING INDUSTRIAL TRAINEES**

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In the Chemical Engineering Department, Universiti Teknologi Malaysia (UTM), all third year students are required to undergo their industrial training for 10 weeks. This paper discussed about industries perception towards UTM Chemical engineering industrial trainees' professional skills such as team working, communication skill, leadership skill, creative and critical thinking, problem solving, life long learning, ethics and entrepreneurship skill. A survey was conducted for 3 consecutive years 2006, 2007 and 2008. In this study, more than 100 participating industries are involved. Analysis indicates that students still having problem to work independently and work in a team (LO5), lifelong learning (LO6) as well as ethics (LO7).

## **11.1 OVERVIEW**

Lack of professional skills is a global issues, which is occurring not only in Malaysia but also in developing countries like the US and the UK. For instance, the UK government has acknowledged the fact that it is faced with problem of getting graduates with ‘soft skills’ [1]. In the US, it has been regularly reported in the media that the country is facing a shortage of employees with the “right” set of skills and this has affected the national economy [2]. According to a research study of employability, junior employees’ responses pointed to degree experiences, personal qualities, communication skills and more pragmatic aspects which helped them gained employment in their graduate jobs. As for senior employees, five main points were given when describing what their organization sought in applicants. These are quality of, and performance in education, knowledge and skill, personal characteristics, communication skills and work experience [3].

Regard to this issue, Universiti Teknologi Malaysia has responded aggressively by introducing UTM graduate attribute, English support program (ESP) and program Degree++. In early 2007, the university decided to review its graduate attributes by incorporating management skills, leadership and entrepreneurship. This review was carried out is in line with the generic attributes outlined by the ministry of higher education (MOHE).

**Table 11.1.** Comparison between PO for Chemical Engineering undergraduate program in terms of EAC, MOHE and UTM Attributes.

<i>PO (BSc. CHEMICAL ENGINEERING)</i>		<i>Section 4.0 of EAC manual (2007) <sup>[1]</sup></i>	<i>MOHE</i>	<i>UTM Attributes</i>
PO 1	Ability to apply knowledge of chemical / gas engineering principles and state of the art engineering tools, including ICT, necessary for operating and designing systems and as well as conducting R&D activities.	i, ii, iv, v	iii, vi	Critical thinking and problem solving
PO 2	Ability to identify, formulate and solve chemical / gas engineering and related problems through effective thinking skills such as creative, innovative, lateral and critical thinking.	iii	iii, v	
PO 3	Ability to communicate effectively through written and oral modes to all levels of society	vii	ii	Communication
PO 4	Ability to lead a team by setting direction,	viii	ii	Leadership

	providing motivation, delegating tasks and integrating contributions			
PO 5	Ability to work independently and function confidently as an individual and in both single and multi-disciplinary teams.	viii	vii	Teamworking
PO 6	Ability to perpetually seek and acquire technical and contemporary knowledge.	x	i	Lifelong learning
PO 7	Demonstrate high ethical standards in professional practice, including environmental and social issues.	vi, ix	vii, viii	Ethics & Integrity
PO 8	Ability to incorporate knowledge in business thinking /entrepreneurship related decision making process.		iv	Entrepreneurship

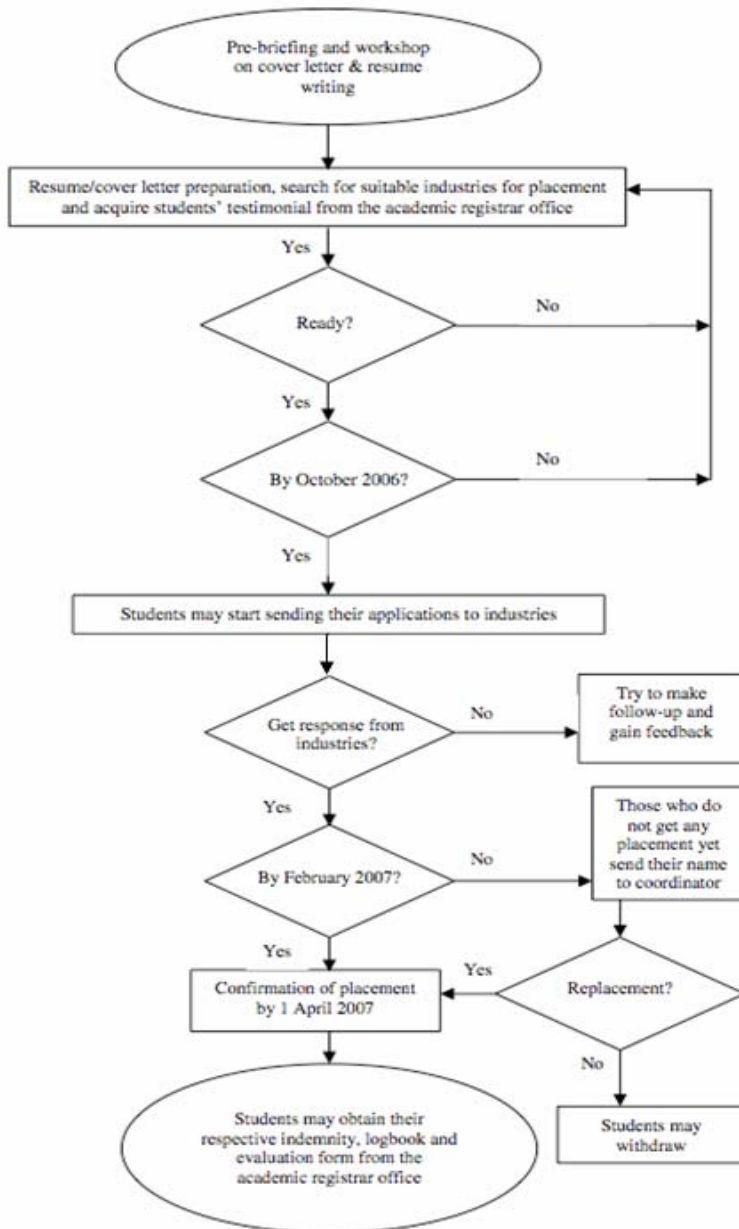


Figure 11.1. Summarized procedure for students' application [2].

Therefore, the chemical engineering curriculum and syllabus development and as well as the program outcome have been designed to satisfy the EAC program outcomes, MOHE generic attributes as well as UTM generics attributes, as shown in Table 11.1. Ministry of higher education's (MOHE) generic attributes are listed, as follows:

- a. Lifelong learning and information management
- b. Communication skills
- c. Thinking skills and scientific approach
- d. Management and entrepreneur-ship skills
- e. Technical/practical/psychomotor skills
- f. Knowledge
- g. Social skills and responsibilities
- h. Professionalism, value, attitude and ethics

All students undertaking the Chemical Engineering degree courses in Universiti Teknologi Malaysia (UTM) are required to undergo industrial training during their final year of study for a period of ten weeks at any related industries nationwide. This is inline with the Engineering Accreditation Council requirement of a minimum of two months continuous industrial training with one credit hour given for every two weeks of training [4]. The industrial training is to enable the students to put their theoretical knowledge into practical, 'real-world' experiences before graduation.

In the department of Chemical Engineering at UTM, third year students are given the freedom and opportunity to seek for suitable places for their placement preferably the nearest location to their home. The summarized procedure for the students' application to industries is as shown in Figure 11.1. Since 2004, chemical engineering students had managed to get 100% placement for industrial training ranging from multinational companies, factories, government sectors, consultants and research institutions nationwide [5].

During the training period, students will be given assignment(s) by the participating agency/company. In the middle of the industrial training period, a number lecturer from the faculty of Chemical and Natural Resources Engineering will visit the students to evaluate the students' performance, to instigate discussion on research/service opportunities with the organization and also to conduct a survey on the employers' perception on the students' industrial trainings.

The organizations are also required to fill the students' evaluation form which carries 30% of the total mark. 40% of the mark will be from the students' training report, 20% from the faculty supervisor and 10% from the students' logbook. Two weeks upon completion of the industrial training the students will be interviewed by the industrial training coordinator on their trainings. The industry will also assessed student performance with regard to professional skills, challenges and problems encountered and also any suggestions for improving the industrial training.

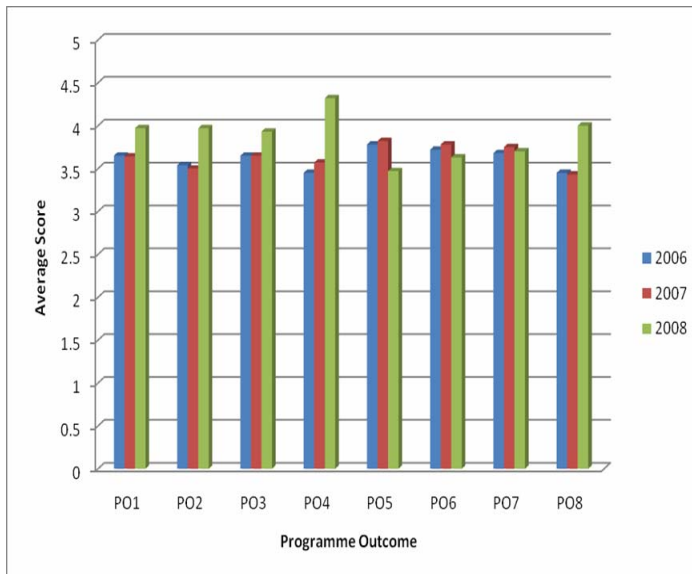
## **11.2 METHODOLOGY**

A total of 72 companies participated in the survey in 2006, 84 companies responses in 2007 and 66 companies responses in 2008. Quantitative assessment methods embedded in survey questions were used to measure the accomplishment of POs. The survey data collected were processed and their achievement is reported in terms of mean or average score (on a scale of 1-5 with 5 being most positive view). The department seeks to differentiate between those outcomes that have met the POs target performance and those areas needing minor or significant improvement. To meet the department's standards, the mean value for each PO must be 3.25 (equivalent to 65% or B grade based on academic rating) or higher.

### **11.3 RESULTS AND DISCUSSION**

Figure 11.2 shows the average competency level of three cohorts of chemical engineering students who undergo industrial training at various organizations in 2006, 2007 and 2008, respectively. The overall average scores for these three cohorts were in the range 3.25 to 4.5 and they are well above the benchmarking score of 3.25 (i.e. 65%). The overall performance of the 2007/08 intake was better compare than 2005/06 and 2006/07 intake except for LO5, LO6 and LO7. From the analysis, students still having problem to work independently and work in a team (LO5), lifelong learning (LO6) as well as ethics (LO7). PO8 is explicitly subjective because not all industry were exposed the students to this kind of skill. The reason is not really known as a few more surveys are required to determine the trend for PO5, PO6 and PO7.





Score indicator :

5=very competent,  
4 =competent ,  
3=acceptably competent ,  
2=not competent,  
1=not competent at all

**Figure 11.2.** Potential employer rating on students' achievement of POs during industrial training.

## 11.4 REFERENCES

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