

Available online at www.sciencedirect.com**SciVerse ScienceDirect**

Procedia - Social and Behavioral Sciences 59 (2012) 598 – 603

Procedia
Social and Behavioral Sciences

UKM Teaching and Learning Congress 2011

Industrial training as a benchmark of the employability for the mathematical sciences students of UKM

Nora Muda*, Ummul Khair Salma Din, Noriza Majid, Rokiah Rozita Ahmad, Faridatul Azna Ahmad Shahabudin, Azmin Sham Rambely & Nur Riza Mohd Suradi

Faculty of Science & Technology, Universiti Kebangsaan Malaysia

Abstract

Industrial Training course (ITc) is a student's placement programme in organizations outside the Universiti Kebangsaan Malaysia (UKM). The aims of the training are to expose students to real working environment and enhance the knowledge and skills in their profession. The program is expected to produce students with competencies required by employers. This study was conducted to determine the effectiveness of the ITc in providing work experience to students of Mathematical Sciences. In addition, feedback from the industries on skills and abilities of Mathematical Sciences students in performing their tasks is obtained. Information from students and employers are collected through questionnaires which were distributed to all Mathematical Sciences students who undergo ITc and the employers during the ITc assessment visits. Analysis of the survey shows that overall, Mathematical Sciences students agreed that the program is helpful in providing exposure and experience to them. From the perspective of employers, the findings show that the employers are satisfied with the skills and abilities of the students in carrying out the assigned tasks.

© 2011 Published by Elsevier Ltd. Selection and/or peer reviewed under responsibility of the UKM Teaching and Learning Congress 2011 Open access under [CC BY-NC-ND license](http://creativecommons.org/licenses/by-nc-nd/3.0/).

Keywords: Experience; industrial training; skills

1. Introduction

Industrial Training course (ITc) is a component of learning programme that provide an opportunity for the students to learn in the working environment in order to prepare them with the real working environment. Besides, it will also enhance students competency as well as working experience to increase the marketability of the students. Starting on session 2010/2011, all the undergraduate students including international students are required to perform ITc on their third semester of their final year for a certain period. This is to expose the students with the real working environment as well as to apply their knowledge and enhance the skills according to their field of studies. Furthermore, this training will also provide entrepreneurship, teamwork, and decision making experiences to the students.

* Corresponding author. Tel.: +6-03-8921-3718; fax: +6-03-8925-4519
E-mail address: noramuda@ukm.my

Stakeholders are important component in university's accreditation programme. Their views and recommendation would help in maintaining and improving the quality of curriculum as well as synchronizing it with the market demand. Even though relationships with the stakeholders are crucial, it is still unsatisfactory and need to be enhanced (Berita Harian, 2007). Therefore, the ITc is hoped to be able to strengthen this relationship. The enhancement could be increased from time to time by receiving feedbacks from the industry regarding the performance of the students during their training.

Feedbacks from the industries and students are needed to determine the marketability of the students. Various studies have been done related to the industrial training at tertiary level education which focused on employability (Chai & Christine, 2010), employer's feedback (Ng et al. 2009), effectiveness of ITc (Abd-Karim, 2009; Abd. Hair, 2004; Lai et al., 2007), self-confidence (Omar et al., 2008), and curriculum (Shahrir et al., 2005).

In this study, the feedbacks from employers and students involved in the ITc are needed to determine the effectiveness in providing working experience for the PPSM students. This investigation on the ITc program is important and benefitted the PPSM and the students as well.

2. Data and Methodology

Surveys have been conducted on the final year PPSM students and the industries. There were 148 respondents among the final year students of PPSM involved in the survey with 70, 68 and 10 respondents from Statistics, Mathematics, and Actuarial Science programmes, respectively. 136 feedbacks were obtained from the industries which comprised 22 from government, 77 from private, 27 from government related agencies and three from other sectors.

The questionnaires for students consist of eight parts while in the employer's questionnaire is divided into five parts. In order to determine the feedbacks from the students on the effectiveness of ITc in providing exposure and work experience, a Likert scale ranging from 1 to 5 was used as a measurement tool. Likewise, the feedbacks from the employers regarding on their satisfaction on the student performance during ITc were measured. Scale 1 represents strongly disagree/very unsatisfied while 5 represents strongly agree/very satisfied. A descriptive analysis was done to gather respondents' profiles based on demographic factors while the hypothesis testing was done to compare the level of skills and ability of the students during the ITc based on the perspective of employers and students. The hypotheses tested are:

- H₁: There is no difference between employers and students feedback on the students' communication skills
- H₂: There is no difference between employers and students feedback on the students' leadership skills
- H₃: There is no difference between employers and students feedback on the student ability to work in group
- H₄: There is no difference between employers and students feedback on the student ability to perform task
- H₅: There is no difference between employers and students feedback on the student ability to understand instruction from supervisor
- H₆: There is no difference between employers and students feedback on the student ability to use the latest technologies
- H₇: There is no difference between employers and students feedback on the student ability to give opinion related to the task
- H₈: There is no difference between employers and students feedback on the student ability to make decision

The *t*-test and the Analysis of Variance (ANOVA) were used to conclude the hypotheses tested

3. Results and Discussion

3.1 Profile of Respondents

Respondents of the surveys consist of 28.9% males and 71.1% females. In terms of organizational sectors, 26.8% are financial sectors, followed by 18.8% service sectors and 11.4 % are other sectors as stated in Table 1. Out of 136 employers, 56.6% are private sectors, followed by 21.3% are government sectors, 19.9% are government related

agencies, and only 2.2% are other sectors. From the organization sectors, majority are form the Financial sectors, which accounted for 27.2%.

Table 1. Profiles of respondents

Profiles of Students		No.	%	Profiles of Employers		No.	%	
Sex:	Male	42	28.9	Type of organization	Government	29	21.3	
	Female	106	71.1		Private	77	56.6	
Program:	Actuarial science	10	6.7		Government agency	27	19.9	
	Mathematics	68	46.0		Others	3	2.2	
	Statistics	70	47.3		Organization sectors	Financial	37	27.2
Organization sectors :	Financial	40	26.8			Manufacturing	13	9.6
	Manufacturing	8	5.4			Service	24	17.6
	Service	28	18.8			Industrial	4	2.9
	Industrial	10	6.7			Property development and construction	2	1.5
	Property development and construction	5	3.4			Education	14	10.3
	Education	14	9.4	Consultation		5	3.7	
	Consultation	12	8.1	Transportation		1	0.7	
	Transportation	2	1.3	Agricultural and food		1	0.7	
	Agricultural and food	2	1.3	Defense and security		1	0.7	
	Communication and IT	9	6.0	Communication and IT		8	5.9	
	Others	17	11.4	Others		25	18.4	

3.2 Student's Selection Criteria for Industrial Training

In the questionnaires, 12 criteria were given to be selected by the employers as the conditional acceptance for the ITc placement, which are communication skills, languages proficiency (English, Malay and other language), working experience, ITc duration, academic qualification, resume, company policy, quota of ITc and students involvement in co-curriculum and sports activities. From the analysis, it is found that three main criteria were identified as the selection attributes for acceptance of placement by the employers, which are communication skills, English and Malay languages proficiency with overall mean of 4.50, 4.29, and 4.13, respectively.

From the employer's point of view, private sector expresses communication skill is the most important in the selection criteria, which accounted for 43.2%, followed by 33.8% from government sector and 21.6% from government agencies. Private sector regards English language as the medium of instruction with a percentage of 72.9%. Therefore, students with good English command are selected. However, government sector prefers students who are fluent in Malay language (43.1%) followed by 32.8% from government agencies and 22.4% from private sector. As a conclusion, the government sector choose students with good ability in Malay language compared to private sector which prefers English.

In order to justify which type of sector that really looked at these three criteria before selecting the students, the percentages of each sector were measured. For the English proficiency, 33.3% from financial sectors which selected students with good command of English, followed by service sectors; 16.7% manufacturing sector; 14.6% and consultation sector; 6.3%. On the other hand, the employers from financial sectors (29.3%) also looked at the Bahasa Melayu proficiency to select students followed by 20.7% from education sectors, 19% from service sector and 6.9% from manufacturing sectors. For the communication skills, 25.7% from financial sectors were said it was

very important to have students with good communication skills to undergo ITc in their place, followed by service sector (20.3%), education (16.2%) and manufacturing (5.4%).

3.3 Offering Student a Permanent Position

Based on the survey, from the students' feedback, there were 54.1% out of 148 respondents were get offered to a permanent position in their ITc company, where among of them, 57.5% were Statistics student, 31.3% were Mathematics students and 11.3% were from Actuarial Science students as in Table 2.

Table 2. Number of students offered a job

	Number	%
Yes	80	53.7
No	68	45.6

While from the employers' feedback, from Table 3, there were 53.7% employers were interested in offering the student a permanent position.

Table 3. Number of company interested to offer a job

	Number	%
Yes	73	53.7
No	11	8.1

3.4 Industrial Training from the Perspective of Employers and Students

Descriptive analysis has been done to measure the effectiveness of industrial training in providing exposure and work experience to the students. From fourteen items that been asked, the overall mean of effectiveness of ITc is 4.302 from scale 5.0. In general, students agreed that the program has successfully provide exposure and working experience to them. From the perspective of employers, the findings show that the overall mean is 4.352. The employers are satisfied with the skills and abilities of the students in carrying out the assigned tasks. Table 4 potrays the mean for each questions on the students skills and abilities from the students and employers' feedback. Overall, students agreed that ITc has enhanced their skills and abilities in carrying out the given tasks and employers are satisfied with the performance of students based on their skills and abilities.

Table 4. Means for students' skills and abilities from the employers and students' feedback

Skills and Abilities	Students	Employers
Communication	4.622	4.257
Leaderships	4.155	3.868
Perform task	4.351	4.452
Decision making	3.973	4.022
Group work	4.432	4.463
Understand instruction	4.493	4.515
Giving opinion related to the task	4.162	4.132
Using latest technology	4.284	4.324

From the employers' point of view, almost all items of skills and abilities are greater than scale of 4 which imply overall satisfaction on the students' performance. An exceptional view has been point out on the expect of leadership where the level of satisfaction is 3.868. This should be understood due to the ITc has its limit in providing opportunities for them to show their leadership skills.

In comparison between the employers and the students' feedback regarding the students skills and abilities, the *t*-test has been conducted and the results are shown in the Table 5. It was found that all the *p*-values; (except for communication skills and leadership skills) for skills and abilities of students from both employers' and students' perspective were greater than 0.05, meaning that the test failed to reject H_0 . Therefore, it can be concluded that there were no significant difference between employers and students' feedback on the ability and skills during ITc. Two items, which are communication and leaderships skills gave significant difference between employers and students feedback. It shows that there were contradict feedback on the students' communication skills and leadership skills from the employers and students' feedback that need to be analyzed further.

Table 5. ANOVA table of skills and abilities of students during ITc from perspective employers and students

Skills and Abilities	<i>F</i> -table	<i>p</i> -val
Communication	25.305	0.000
Leaderships	9.564	0.000
Perform task	2.409	0.122
Decision making	0.252	0.616
Teamwork	0.158	0.691
Understand instruction	0.114	0.736
Giving opinion related to the task	0.120	0.729
Using latest technology	0.243	0.622

Further investigation on each major and minor courses that were offered in PPSM are really in need, as to determine which courses that will help students to improve their communication and leadership skills.

4. Conclusion

As a conclusion, based on the feedback from the employers, there are three main criteria observed in selecting the ITc students which are the communication skills, English and Bahasa Melayu proficiencies. Majority of the employers from the private sector prioritized the student who has good in English while government sectors prefer students with good Bahasa Melayu. In terms of marketability of the Mathematical Sciences students, almost half of them have been offered job from the company where they under went their ITc. In general, the industry satisfied with the performance of the students and their skills. On the students' perspective, they agreed that the industrial trainings helpful in providing exposure and experience while from the employers side, they are satisfied with the skills and abilities of the students in carrying out the assigned tasks. On the other hand, two skills (communication and leadership) need to be inspected to fulfill the requirement and demand from the industries.

Acknowledgement

We would like to thank Universiti Kebangsaan Malaysia for providing the research grant (UKM- PTS-2011-039).

References

- Abd.Hair Awang. (2004). Keberkesanan Kebolehpasaran Pelatih Dalam Industri Latihan Vokasional Terpilih Di Malaysia. PhD thesis.
- Abdul-Karim, Z.A. (2009). Measuring the success of industrial internship programme for undergraduate study. *International Engineering Education Conference, Madinah, Kingdom of Saudi Arabia*, 143-147.
- Berita Harian. (2007). Kerjasama industri, IPT mestierat. (16 Jan 2007)
- Chai, L.G. & Christine S.H.L. (2010). Graduates' Employment: The Value of Curtin University of Technology Sarawak's Graduates. *International Journal of Marketing Studies*, 2(1), 127-132.
- Lai, F.W., Abd-Karim, Z.A. & Johl, S.K. (2007). Examining a Successful Industrial Training Program Module: Inter-Relationship among the Three Main Stakeholders: Students, University and Host Company, *2nd Regional Conference on Engineering Education*.

- Ng, P. Y, Abdullah Shamsul Kamariah, Nee, P. H. & Tiew, N. H. (2009). Employers' Feedback on Business Graduates and Curtin Graduate Attributes: An Exploratory Study in Curtin Sarawak. *Paper presented at the Proceedings of Asian Business Research Conference*, 1-12.
- Omar, M.Z., Darus, Z.M., Kofli, N.T., Mat, K., Osman, S.A. & Rahman, M.N.A. (2008). Manfaat kursus latihan industri dalam Meningkatkan keyakinan pelajar. *Peka 2008*. 1-13.
- Shahrir, A., Wan Hamidon, W.B., Riza Atiq, A.O.K., R., Baba, M.D., Mardina, A., Noorhisham, T.K. & Mazlan, M. T. (2005). Maklum Balas Penyelia Latihan Industri Terhadap Objektif Dan Hasil Pembelajaran. *Seminar Pengajaran dan Pembelajaran Berkesan 2005*, 164-172.