

The English Proficiency of Civil Engineering Students at a Malaysian Polytechnic

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Abstract

The purpose of this study was to investigate the English proficiency of civil engineering students of a Malaysian polytechnic. A questionnaire, modeled after the Programme for International Student Assessment (PISA) approach and The Secretary's Commission on Achieving Necessary Skills report was developed and administered to 171 civil engineering students. These students had completed a mandatory one-semester industrial training programme with various organizations. This post industrial training survey, through the use of a self-report questionnaire, provided an important opportunity to capture crucial data from students regarding their English language skills. Findings of this study revealed that the students frequency or ability of using the English language was low, irrespective of the type of workplace or level of study. Analyses of skill deficiencies revealed wide learning gaps between the acquired and required English skill attributes. Analysis of the survey data had also identified a list of important skill attributes in the workplace, and the four most highly valued English skill attributes were a combination of academic and specific job-related tasks: *understanding technical documents, correct grammar, vocabulary and sentence structure, writing test/investigation report and questioning for clarification*. The results of this study implied the need for curriculum changes (such as content and mode of delivery) so that polytechnic graduates could meet the workplace expectations.

Keywords: Employability skills, English proficiency, Skills gaps

1. Introduction and Background

Employability skills of fresh graduates have constantly received considerable attention in the local media. Lack of English language proficiency has often been cited as one of the major factors contributing to graduate unemployment. (Sharif, 2005). Jawhar (2002) stated that in the private sector, graduates are becoming unemployable as a result of lack of proficiency in the English language. Various surveys have been carried out on employers in relevant industries to gauge whether graduates are meeting industry needs and the recurring theme that emerged from these surveys has been the lack of English language skills among fresh graduates and workers (MoHE, 2008; Tneh, 2008; The World Bank, 2005; Ambigaphaty & Aniswal, 2005; Sibat, 2005). In generally, these studies implied that the majority of graduates and workers were limited users of English especially in writing and speaking.

Academics and the government have expressed their concern over the deteriorating level of English proficiency among the students in Malaysian schools and universities (Badioze Zaman, 1998). In 2000, the Malaysian Ministry of Education introduced the Malaysian University English Tests (MUET) with the objective of enhancing the English language ability of pre-university students. This was followed by the implementation of the teaching of science and mathematics in English in secondary schools in 2003 with the objective of enhancing the English proficiency of students when they enter universities or the job markets. Findings from studies conducted by the Malaysian Ministry of Higher Education MoHE (2006) and Pawanchik (2006) however, revealed that more than 50 % of MUET scores were either in Band 1 (extremely limited user), 2 (limited user) or 3 (modest user).

Studies on the mastery of the four skills (listening, speaking, reading and writing) and reading habits indicated that although students perceived English to be important for their academic needs, the language was mostly used for reading purposes only (Tan cited in Othman, 2005; Kaur and Thiyagarajah (1999)). In ranking the importance of the skills, students ranked writing as their least competent skill and regarded speaking and writing as the most important skills needed to master the language (Othman, 2005). Pandian as cited by Giridharan and Enriquez (2002) on the reading habits of students in Malaysia revealed that 80.1 % of university students were *reluctant readers of English language materials*. The lack of proficiency in the writing skills as required in the workplace is demonstrated by a study conducted by Stapa and Mohd Jais (2005) where students stated that the English programme that they went through before their practical training was inadequate in preparing them for workplace writing tasks.

Tong (2003) in a study on identifying essential learning skills in students' engineering education stated that the majority of employers expressed dissatisfaction with students' communication abilities. This ranged from failure in both written and oral communication skills to presentational and other work-specific communication skills such as informal discussions, public speeches and interviews. According to Riemer (2002), the concept of English for Special Purposes (ESP), will achieve more in the education of engineering students by focusing on the learner's attention on the particular terminology and communication skills required in the workplace. Attributes identified for English proficiency of engineering students are: 1) spoken language fluency, 2) written language fluency, 3) regional/national dialects, 4) technical terminology, and 5) professional jargon. The author also suggested that engineering exercises incorporate oral and written communication skills throughout the curriculum. This includes presentation and communications as part of the assessment process. Curry, Sherry and Tunney (2003) report of a project to identify the transferable skills graduates believed had been important to them in their careers since graduation. One of the main findings of the survey showed that oral communication skill was ranked as the most important transferable skill, ahead of presentation and writing skills. This finding is consistent with another study (Kwok, 2004) where students recognized the importance and the need to develop oral and written communication skills.

In the Malaysian polytechnic education system, English for Technical Purposes (ETP) is taught for 3 semesters for certificate courses and 5 semesters for diploma courses. The course content for ETP prepares students with study skill, information processing skill, reading skill, and oral communication skill. Other skills in ETP modules are report writing, job hunting, and description of object/product specification. These skills will initially be required during a mandatory one-semester industrial attachment programme with either government agencies or private organizations. Information collected from Malaysian polytechnic graduates through the Graduate Tracer Studies (2004 to 2008) confirmed the concerned expressed by the employers when the respondents opined that they lacked skills to converse and write in English. Responses from open-ended questions obtained from the graduates on the quality of teaching and learning in the polytechnics indicated their disappointment with the teaching of English in polytechnics. The findings of the Tracer Studies clearly showed that the teaching and learning of the English

language is, thus far, not effective in producing graduates with an acceptable level of English proficiency as required by the industry.

2. Objectives of the Study

The objectives of the study were as follows: (1) to assess the English proficiency of civil engineering (CE) students of a Malaysian polytechnic (i.e., in terms of their frequency of application, satisfaction on their ability and perceptions regarding their acquired and required proficiencies); (2) to determine the importance of different English skill attributes needed on the job for CE students; and (3) to determine the gaps between the acquired and required skill attributes as perceived by the CE students.

3. Methodology

3.1 Design

This study used a quantitative, descriptive design where data was collected to assess the English proficiency of civil engineering students. A survey instrument was designed specifically for this study. The instrument used comprised of demographic variables and four English proficiency components. These components were frequency of usage, satisfaction on ability and the acquired and required proficiencies.

3.2 Sample and Data Collection Procedure

This study involved 171 civil engineering students (97 diploma-level and 74 level-certificate programs) from a Malaysian Ministry of Higher Education (MoHE) polytechnic. These students had just completed a one-semester mandatory industrial attachment program with various engineering organizations. Eighty one students (47.4%) were males and ninety students (52.6%) were females. The students were briefed on the purpose of the study and instruction was given on how to respond to the questionnaire. The questionnaires were administered in-situ and all the response sheets were retrieved from the respondents.

3.3 Instrumentation

Items in the survey instrument was designed based on the Programme for International Student Assessment (PISA) and other literatures. This assessment approach, initiated in 2000 by the Organization of Economic Cooperation and Development (OECD) was to assess students across a range of skills required for a variety of tasks that the students have to perform. The definitions of the domains for this study (*reading, writing and speaking*) were adapted from the SCANS report on skills that were required to enter the workplace successfully. The report identified workplace know-how that defined effective job performance.

The instrument was divided into four parts. Part A was on the demography of respondent (sex, race, type of training provider (public/private) and core business of the training provider). Part B assessed the students' perception on the *frequency* of the usage of the English language during their training and a Likert-type scale was used with four choices (not use at all, used infrequently, used frequently, used very frequently). Part C assessed the students' perception on their *ability* to use the English language during their training. A Likert-type scale was used with four choices (not at all satisfied, not satisfied, satisfied, very satisfied). Part D assessed the students' perceptions of their acquired and required English proficiency. Four choices (not competent, slightly competent, competent and very competent) were used to rate the students' perception of their acquired skills and another four choices (not needed, not really needed, needed and essential) were used to rate the students' perceptions of required skills.

Cronbach's alpha was used to determine the internal reliability of the survey instrument which consisted of a thirty-six items scale. The instrument was tested in its entirety and the four individual sub-sections of the survey were tested independently. The Cronbach's alpha reliability coefficients for the individual sections of the survey ranged from a low of 0.727 to a high of 0.928. These results indicated moderate to high levels of internal reliability.

To test for construct validity, factor analysis was employed to determine whether the items could be classified into different categories. Four subscales and 36 items were originally developed for the questionnaire and, after factor analysis, the same four subscales and 36 items remained. All items have a loading of more than 0.4 on their *a priori* scale and no other scale. The percentage of variance ranges from 45.178 to 66.657 for different scales. The factor analysis of the items from the four subscales confirmed the factor structure of the questionnaire and these were operationalized as: frequency of usage, ability, acquired skill, and required skill.

3.4 Data Analysis

The Statistical Package for the Social Sciences program (SPSS) 11.5 for windows was used for analyzing the data. Statistical analyses were used to investigate the differences on the frequency of the application of the English language based on the type of training provider. The differences in the students' ability to use the English language

were also statistically analyzed based on their study levels. Further statistical analyses were used to investigate the differences between the students' acquired and required English skills.

4. Results and Discussions

4.1 Demographic Analysis

Demographic data collected on student participations included gender, race, English language achievement at Malaysian Certificate Education (SPM) level, study level (certificate or diploma programme), type of training provider (public or private sector), and industrial classification of training provider (e.g. housing developer, consultant, government agencies etc.). The English language achievement at SPM level was classified into 5 categories, whilst the type of training provider and its classification were divided into 2 and 4 categories respectively.

Slightly more than half (52.6%) of the respondents were females and Malays. 64.5 % of the respondents obtained grades of 7D, 8E and 9G for their English language subject at Malaysian Certificate Education (SPM) level (Table 1). As for the type of training providers, 43.6% of the respondents undertook their training with government agencies, compared with 56.4 % who did their training with the private sectors (Table 2).

4.2 Descriptive Statistics

4.2.1 Frequency of the Usage of English Language

The frequency of the usage of English language (oral, reading and writing skills) was compared between students who received training either in public (government-owned) or private organizations. The results (Table 3) indicated that students' use of English was more or less the same, irrespective of the place of training i.e. public organization ($M = 2.14$, $SD = 0.471$); private organization ($M = 2.15$, $SD = 0.409$). The mean 'frequency of usage' score of slightly more than 2.0 showed that students' usage of the language was not very frequent. This could be attributed to several factors: a) students' inability to communicate effectively, thus avoiding the used of the language on a regular basis, b) the training organization's main language of communication and its attitude towards the English language, and c) a combination of the above two factors. It is difficult to reach a firm conclusion regarding this finding since no information was gathered with respect to the training organization's language preference when communicating with the trainees. However, this finding supports the results of previous studies (Kaur & Thiyagarajah; 1999; Othman, 2005; Pawanchik, 2006) regarding students' ability and confidence in using the English language at the workplace.

4.2.2 Students' Ability to use the English Language

The students' perceived ability in using the English language was compared between certificate and diploma-level students. The results (Table 4) indicated that the diploma-level students' perceived ability in using the English language was marginally higher ($M = 2.20$, $SD = 0.418$) than their certificate-level counterparts ($M = 2.14$, $SD = 0.426$). This result is inconclusive since an almost equal number of students from both courses obtained low grades of 7D, 8E and 9G in the Malaysian Certificate of Education examinations (Table 1). However, the mean scores of less than 3 for both certificate and diploma-level students indicated that the majority of students were not satisfied with their ability in the language. This finding validates the findings of previous tracer studies (Navi Bax and Mohamood, 2001, 2003; MoHE, 2005) of graduates dissatisfaction regarding their level of English proficiency acquired from the polytechnic education system. This finding also supports what previous studies (Cooper, 1987; Vazquez, Vazquez, Lopez & Ward; 1997; Dakroub, 2002; Nikolova & Taylor, 2003) have found regarding the relationship between ability level and language acquisition.

4.2.3 Students' Acquired and Required English Proficiency

The students' acquired and required English proficiency skills were compared to investigate the skill gaps and deficiencies. Based on the results of Table 5, this study showed that there were skills gaps between the acquired and required oral, reading and writing skills. The mean 'acquired' score of less than 3.0 indicated that the students were still not competent in the three domains of the language, i.e., oral, reading and writing skills. Thus, polytechnic educators and curriculum developers may like to examine this gap-in-skill deficiency and accordingly address this issue in the current syllabus.

4.2.4 The Rank Order of Required Skills

The students' perceived required skills were further investigated by ranking them in the order of importance (Table 6). In ranking the required skills and analyzing the data, past studies by Curry, Sherry, and Tunney (2003) and Tong (2003) were used as guidelines.

From Table 6, the skill of 'understanding technical document' was the top important skill, where 68.4 % of students rated 'understand technical document' as essential. The second top ranked skill was 'correct grammar, vocabulary and sentence structure' where 66.1% of students rated as essential. The third important skill was 'writing test/investigation report' where 64.3 % of students rated it as essential. However, the difference in mean scores between the second and third ranked skill attributes was very small (0.01 %). The skills of 'writing official document' and 'writing work summary' were both ranked fifth based on the same mean scores and the same percentage of students (51.5 %) that viewed 'writing official document' and 'writing work summary' as essential. The skill attributes of 'write official document' and 'write work summary' had the same mean score (3.47). Similarly, the skill attributes of 'explain technical terms orally' and 'understand work schedule' also had the same score (3.46). The difference in the mean scores is illustrated in Figure 1.

The ranking of *understanding technical document* as the most required English proficiency skill demonstrated the importance of introducing particular (technical) English workplace terminologies as recommended by Riemer (2002). The students' perception of the importance of reading skills also aligns with another study on job-related needs (Ong, 2002).

The 'writing incident/accident report' skill was ranked last by the students where only forty five percent (45 %) of students rated it as essential. Although the five skills of 'explain technical terms in written form', 'express opinion/ideas', 'write official document', 'understand written instructions', 'official/public talk' and 'write incident/accident report' were perceived to be the least important, the mean scores were still higher than 3.0. This was due to the fact that less than twenty percent of respondents viewed these skills as 'not needed' or 'not really needed'. As illustrated in Table 6, above eighty percent (80 %) of the respondents rated all thirteen skills as 'needed' and 'essential'.

4.2.5 Skills Gaps Analysis

The gaps between the acquired and required skill attributes were further investigated to determine the magnitude of skill deficiency. Table 7 and Figure 1 illustrated the difference in the mean scores of the required and acquired skills. The mean scores of the required skills would indicate the importance of those skills, whilst the mean scores of acquired skills would indicate the (actual) performance using those skills.

From Figure 1, the three most significant skill gaps between the required and acquired English proficiency were: presentation skills (official/public talk), understanding technical document, and writing test/investigation report). These three skills were ranked 12th, 1st and 3rd respectively, in the order of importance (Table 6). In contrast, the three least significant skill gaps were: understanding written instructions (ranked 11th), writing work summary (5th), and questioning for clarification (4th).

Revisiting Table 6, presentation skill was ranked second last in order of importance. It is difficult to explain the discrepancy between the ranking order and skill gap of the presentation skill (official/public talk). One possible explanation of this discrepancy could be due to the students' assumption that presentation skills were not greatly required for sub professionals. However, this assumption is not supported by the following studies on employability skills (Riemer, 2002; Curry, Sherry & Turney, 2003; Csapo & Featheringham, 2005). Hence, this negative assumption has to be corrected because as technicians or technical assistants, formal and informal communications with people within and outside one's organization are part of the job (Engineering Council, 2004). Similarly, a good grasp of technical terms in English and the ability to write technical reports would be helpful in enhancing the communication skills of the students. Hence, the teaching and learning delivery need to be reviewed so that the polytechnic students are competent in these three skill attributes.

5. Conclusions and Suggestions

This study revealed that the students frequency and/or ability of using the English language was low, irrespective of the type of workplace or level of study. The students' self-reports of their actual verbal, reading, and writing skills being lower than the corresponding required skills indicate that they have yet to master the skill attributes commonly needed at the workplace. The students' ranking of the English language skill attributes show that job-related tasks such as *understanding technical documents* and *writing test or investigation report* are regarded highly at the workplace. These scenarios imply that the present ETP syllabus has not been effective in developing students' skills where the existence of learning gaps between the actual and required skills shows that the subject contents do not fit the needs of the workplace. They also imply that job-relevant tasks should be prioritized in the teaching of the English language.

Given that the students acknowledge there are deficiencies between their actual and needed skills in the workplace, this highlights an urgent need to review the content and delivery of the ETP curricula. The present polytechnic

English for Technical Purposes syllabus focuses on the general basic skills required by students to enter the workforce. The syllabus is common to all the engineering disciplines taught in the polytechnic education system. Thus, civil engineering students are hardly exposed to the technical terms related to the civil engineering discipline. This problem is further compounded by the fact that the technical subjects themselves are mostly being taught in the Malay language. Hence, it is proposed that the English for Technical Purposes syllabus be designed differently for the various engineering disciplines so that engineering students will be more aware of their workplace language needs. The English for Technical Purposes syllabus should also give more focus on job-related tasks at the workplace.

The polytechnic education system has to respond to the needs of the workplace by producing competent graduates. Therefore, the design of the curriculum which includes the content of the syllabi, mode of delivery and assessment methods must be industry-related. Thus, this study as a whole provides useful information that could be used for further investigations on the English proficiency needs of polytechnic civil engineering students. This study could also be replicated for other engineering disciplines, such as mechanical and electrical. Further investigations could also be carried out on the other important employability skills such as problem-solving and critical thinking. The Engineering Technician Standard (Engineering Council, 2004) could be used as a guide in conducting the study. Findings from these studies would also help the policy makers, curriculum developers and polytechnic educators in designing and developing a curriculum which is relevant to the needs of the industry and therefore help to accomplish the national agenda to be a developed nation by the year 2020.

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Table 1. Classification of English Language Achievement (SPM) of Respondents (n = 171)

		English Language Grade (SPM)									Total
		1A	2A	3B	4B	5C	6C	7D	8E	9G	
Level of Study	Diploma	0	3	5	4	16	11	34	22	0	95
	Cert.	0	0	5	3	7	6	32	15	6	74
Total		0	3	10	7	23	17	66	37	6	169

Note: 2 diploma-level students did not state English SPM grade

Table 2. Industrial Classification of Training Providers

Industrial Classifications		Frequency	Weighted Percentage (%)
Public Sector	Government Agencies (e.g. JKR, JBA)	71	43.6
	Housing Developer / Contractor	72	44.2
Private Sector	Engineering Consultants	19	11.6
	Others	1	0.6
Total		163	100.0

Table 3. Descriptive Statistics for Frequency of Usage of English

	Type of Training Provider	N	Mean	Std. Deviation
English Frequency	public	74	2.14	0.471
	private	96	2.15	0.409

Table 4. Descriptive Statistics for Ability in English Language

	Level of Study	N	Mean	Std. Deviation
English Ability	certificate	74	2.14	0.426
	diploma	97	2.20	0.418

Table 5. Descriptive Statistics for English Skill Attributes (n = 171)

Skill Attributes	Acquired Skill		Required Skill	
	Mean	Std. Deviation	Mean	Std. Deviation
Oral	2.19	0.406	3.42	0.430
Reading	2.54	0.457	3.49	0.525
Writing	2.34	0.457	3.48	0.438

Table 6. The Rank Order of 'Required' English Proficiency

	Mean	Std. Deviation	Level of Requirement (%)				Rank
			1	2	3	4	
Understand technical document	3.63	0.583	0	5.3	26.3	68.4	1
Write with correct grammar, vocabulary and sentence structure	3.59	0.639	1.2	4.7	28.1	66.1	2
Write test/investigation report	3.58	0.622	0.6	5.3	29.8	64.3	3
Questioning for clarification	3.48	0.608	0.6	4.1	41.5	53.2	4
Write official document	3.47	0.577	0	4.1	44.4	51.5	5
Write work summary	3.47	0.587	0	4.7	43.9	51.5	5
Understand work schedule	3.46	0.662	1.8	4.1	40.9	53.2	7
Explain technical terms orally	3.46	0.576	0	4.1	46.2	49.7	7
Explain technical terms in written form	3.43	0.604	0	5.8	45.0	49.1	9
Express opinion, ideas etc.	3.42	0.611	0	6.4	45.6	48.0	10
Understand written instructions	3.39	0.699	1.2	8.8	39.2	50.3	11
Official/Public Talk	3.35	0.618	0.6	5.8	51.5	42.1	12
Write incident/accident report	3.33	0.686	0.6	10.5	43.9	45.0	13

Level of requirement: 1 = Not needed, 2 = Not really needed, 3 = Needed, 4 = Essential (4-point Likert-type scale)

Table 7. Skill Attributes and Mean Scores

Label	Skill Attributes	Mean Acquired	Mean Required	Mean Difference
A	Presentation (Official/Public Talk)	1.81	3.35	1.54
B	Expressing Ideas/Opinion	2.20	3.42	1.21
C	Questioning for clarification	2.58	3.48	0.90
D	Explaining Technical Terms Orally	2.16	3.46	1.30
E	Understanding Work Schedule	2.45	3.46	1.00
F	Understanding Technical Document	2.27	3.63	1.36
G	Understanding Written Instructions	2.89	3.39	0.50
H	Explaining Technical Terms in Written Form	2.23	3.43	1.20
I	Correct Grammar & Vocabulary (Writing)	2.27	3.59	1.32
J	Writing Official Document	2.33	3.47	1.14
K	Writing Work Summary	2.63	3.47	0.84
L	Writing Incident/Accident Report	2.33	3.33	1.00
M	Writing Test/Investigation Report	2.22	3.58	1.36

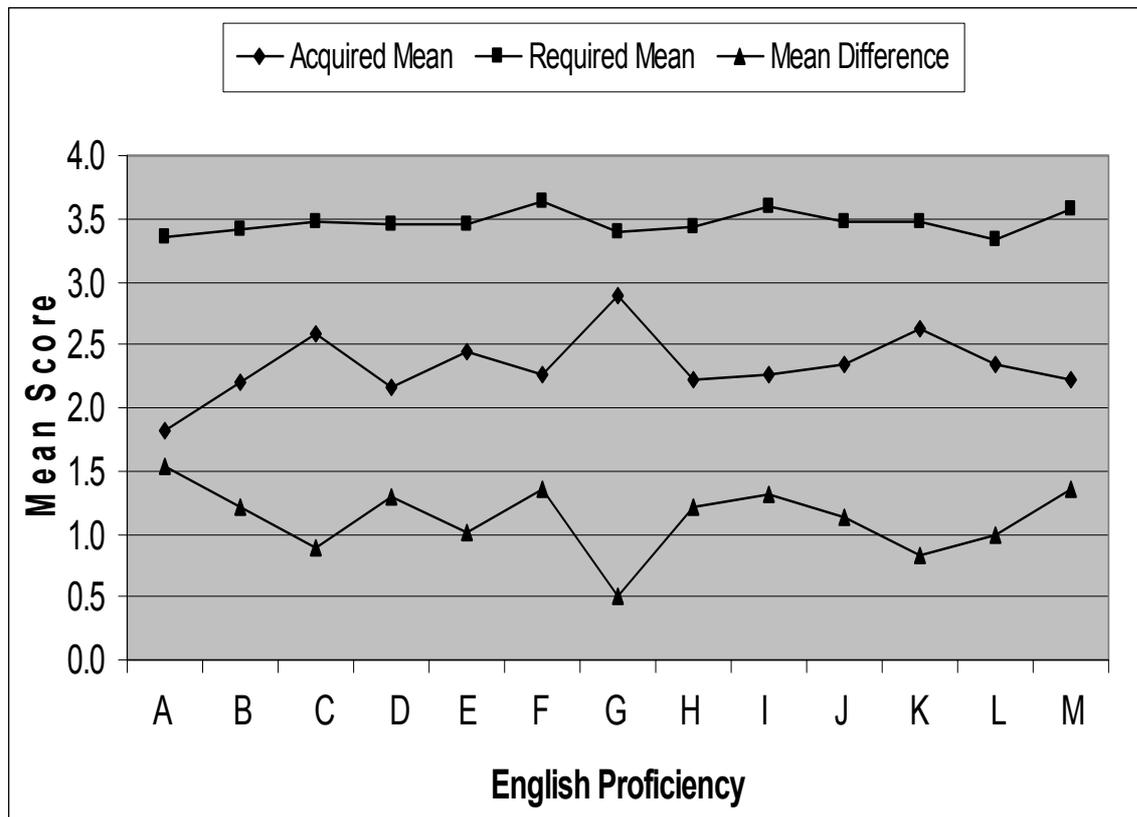


Figure 1. Skills Gaps between Acquired and Required English Skills Attributes