

ENGINEERING STUDENTS' PERSPECTIVES ON THE NEED OF A NEW MODULE IN TECHNICAL REPORT WRITING AT POLYTECHNIC IN MALAYSIA

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Abstract

One of the significant skills in engineering profession which is required in job industries is technical writing. Students of engineering found that writing seems to be a difficult assignment to perform especially in English language. The intention of this study is to identify Malaysian polytechnic students' perspectives in the need of a new module in technical report writing in English. A survey using questionnaire was employed to embark the study. The findings of this study have shown a significant agreement from the students on the lack of information and content provided in the current module used in English language classrooms to carry out a project. Thus, it is concluded that polytechnic engineering students need sufficient materials and writing practices in order to produce comprehensible technical report. Consequently, a new module in writing technical report in English which caters elements on research writing and adequate writing practices should be introduced to the education system in Malaysian polytechnic.

Keywords: Malaysian polytechnic, Technical writing in English, Module in technical report writing, Engineering polytechnic students.

1. Introduction

Being proficient in technical writing cannot be denied in job industries including in engineering profession. The future career of engineering students will be bright if they were equipped with the skills in technical writing [1]. For that reason, technical institutions are responsible to deliver a course in technical writing for the benefits of their students' future career. In fact, the purpose of teaching the

Abbreviations

BEM	Board of Engineers Malaysia
DPE	Department of Polytechnic Education
EAC	Engineering Accreditation Council
ETP	Engineering Technician Programme

course in technical writing is to improve the quality of written technical communication skills by engineering students [2]. Being able to converse in English for both spoken and written are essential keys of success in engineering profession [3]. Thus, various technical institutions have equipped their students to learn English as a course and not as a language [4].

In Malaysia, the Engineering Accreditation Council (EAC) [5] under the Board of Engineers Malaysia (BEM) [6] has been given the authority to certify engineering technician programmes of technical institution which registered with the BEM [6]. This is to make sure that the institution has met the minimum requirement to achieve the practice in the engineering field globally. Being able to converse clearly and concisely in speaking and writing at primary phase are the skills identified by BEM [6]. Thus, engineering students are required to grasp and practice writing technical documents efficiently such as writing technical report [5]. Consequently, many Malaysian technical institutions have provided technical writing course in their curriculum for engineering education programmes [7-9]. However, the curriculum of the English language courses provided at Malaysian polytechnic have very limited context to the requirement by job industries such as technical report writing. This is because, most English language courses at Malaysian polytechnic focus on speaking skills such as to enable the students to communicate well in group discussions and oral presentations [10-11].

2. Literature Review

An empirical study on students perceived technical writing competency needs among polytechnic lecturers and polytechnic engineering diploma students has found out that the Malaysian polytechnic syllabi of English language courses have provided insufficient skills in technical writing [12]. However, the English language courses at Malaysian polytechnics practice more on speaking skills, and this do not support what has been pointed out by BEM [6] which highlights writing skills to be stressed at the early stage of higher learning education. Consequently, Malaysian polytechnics have included technical writing elements in their degree programmes such as in the syllabus of the English for Engineering and Technology course, [13] but not in the English courses for diploma students. Nevertheless, the diploma students of Malaysian polytechnics realised and aware that they also need the skills in technical writing [12].

In the Engineering Technician Programme Accreditation Manual [14], the BEM [6] has specified certain accreditation objective for engineering programmes of the registered technical institutions. One of the requirements is students should be capable to deliver and receive instructions clearly, document work proficiently and delegate works professionally. This is in line with the definition of technical writing which encompasses specific vocabularies used at the workplace in every written communication in the field of engineering, science, and technology [15, 16]. Therefore, skills in technical writing are essential in the engineering profession such

as engineering technician [17]. Thus, in order for any engineering technician to be recognised, they need to be equipped with skills in technical writing.

The syllabi of present English language courses offered for diploma students at Malaysian polytechnics do not deliver the students with the exact language needs as required by the industries. A study at one Malaysian polytechnic indicated that all the diploma programmes provided at Malaysian polytechnics offered the same English courses which are not specific to the skills that the students need according to their specialization [18]. Moreover, another study at other polytechnic in Malaysia on students' perceptions has found that English language courses do not support them in improving their communication skills in English language [19]. Furthermore, another study has discovered that polytechnic students are lacking in understanding technical documents, sentence structure, grammar and other important language elements [20]. Accordingly, the importance of technical writing in English language in engineering profession will be neglected by the students. This has been occurred at other countries. For instance, a study has discovered that numerous engineering students in America have seen that writing is irrelevant to their future profession [21]. However, according to the theory of communicative competence, language users need to be competent in terms of knowledge in grammar as well as in social knowledge [22-24].

A study conducted in India analysed engineering students need on technical writing as a course in order to improve their academic achievements and their work place skills requirement [4]. The study has included several domains of technical writing skills to be analysed such as (1) reading technical and non-technical text, (2) vocabulary building- technical, (3) passive voice, (4) syntax and use of appropriate cohesive devices, (5) format and style of writing technical reports, (6) transcoding, (7) knowledge of styles sheets, (8) use of computers. The results identified that students were lacked of reading habits which led to be short of ideas and concept to write. The finding also revealed the main constraints of the students are on grammar and lacking in vocabulary. Unfortunately, this phenomenon may cause in ethical habit in writing namely plagiarism. Students tend to copy and paste other people's piece of writing easily without crediting the source of the information. However, digital devices can be used to detect plagiarism easily [25]. Consequently, plagiarism will degrade the quality of students' written work which also becomes the common constraints of Malaysian polytechnic engineering students [20].

This study assigns three objectives. The first objective is to identify engineering students' perspectives on the information sufficiency in carrying out a project provided in the English language module used currently at a polytechnic. The second objective is to investigate the engineering students' perspectives on the sufficiency in content provided in the current module used. Finally, the third objective is to discover the perspectives of engineering students on the listed element suggested to be encompassed in a new technical writing module.

3. Methodology

In order to collect data, this study employed a survey design method using semi-structured questionnaire. The questionnaire comprised of two questions on students' perspectives on information and content sufficiency in the current module used. The other question in the questionnaire is on students' perspectives

on a list of elements suggested to be encompassed in a new technical report writing module. The population of this study is 440 final year diploma students of several engineering programmes at a Malaysian polytechnic. 47 % of the population (207 students) participated in this study voluntarily. The questionnaire was piloted prior to this study which was developed and referred to literatures related to areas in technical writing [5, 11, 20, 26-29] and to the theory of communicative competence [22-24]. The format and content applied in the questionnaire have been validated by five professionals in the area of English language.

4. Results and Discussion

Table 1 presents item regarding students' perspectives on the sufficiency in information provided in the current module used to carry out a project. The results in Table 1 revealed about 85.8 % of the students obtained information insufficiency in the module used currently to carry out a project. Thus, it shows a significant agreement from the students that the current module used to carry out a project in the English language courses at a Malaysian polytechnic requires to be upgraded.

Table 1. Students' responses on sufficiency in information provided in the current module to carry out a project at a polytechnic.

	Frequency	Percent	Valid percent
Sufficient	29	14.0	14.2
Insufficient	175	84.5	85.8
Total	204	98.6	100
Missing	3	1.4	
Total	207	100.0	

Engineering students' perspectives on the content sufficiency in carrying out a project provided in the module used currently at a polytechnic were coded and analysed as illustrated in Table 2. Based on the results, respondents 6, 8, 24, 26, and 27 perceived that the module used to carry out a project of English language course did not provide sufficient content. Findings also showed that the students need more information and knowledge in carrying out the project (respondents 3, 6, 8-11, 14, 16, 23, 24, 27, 28-32, and 34). Apart from that, the students also need samples of technical reports and comprehensive exercises on writing a project report (respondents 3, 31, 32, 34, and 59). Consequently, the students complained that the module should be improved (respondents 96, 97, 157, 194, and 203). Some of the identified insufficiency elements in the module used are grammar, exercises in writing, and examples in writing sentences (respondent 58 and 60).

One of the causes of incompetent in communication skills among engineering students is lacking in course content related to technical communication skills offered by technical institutions [30]. Lacking content, grammar, report writing samples and writing exercises provided in the module used may be the caused of negative feedback towards writing in English since students have to struggle to obtain quick solution from the insufficient module used in their English language classroom. Consequently, findings from this study convey that an effective module is important to engineering students in order to write technical report in English. In contrast, engineering students were found that writing in English is isolated in their future profession [21]. Thus, adding relevant information and

comprehensive exercises in a module is paramount important to help improve students technical written work.

Table 2. Students' responses on sufficiency in content provided in the current module to carry out a project.

Respondents	Responses
3, 31, 32, 34, 59	Not enough. We need more information about details of how to carry out the project and examples of written report.
6, 8, 24, 26, 27	No. Need more information, knowledge, explanation, input to carry out the project.
9, 10, 11, 14, 16, 23, 28, 29, 30, 31	No. Need more information to carry out the project.
55, 56, 178, 193, 204, 205	No. Not enough exercise to write a report.
58, 60	No. Need more grammar inputs.
96, 97, 157, 194, 203	No. Module must be improved.

Engineering students' perspectives on the list suggested as new elements to be included in a new technical report writing module are shown in Table 3. Responses from the students showed positive signs ranging from 63%- 78% on the agreement of the suggested elements such as research activities, writing literature review, methodology, instrumentation, data analysis, data interpretation, and so forth. As can be shown in Table 3, about 77.4% of the students agreed if elements of grammar is to be counted in the new module. Conversely, in a study conducted by Nairm [31] identified that it is bored to learn and teach sentence structures and grammar at higher learning institution. On the other hand, the quality of students' writing piece will be degraded [32]. However, according to the theory of communicative competence, language users should master grammar and communication skills [22-24]. Therefore, including grammar input in the new technical report writing module is significant. Clearly, the students were agreed in introducing a new technical report writing module to the system of education in Malaysian polytechnic.

Table 3. Elements to be included in a new module in technical report writing.

Item	Elements to be included in a new module in technical report writing	Yes (%)	No (%)
C2a.	Contents of a project report (Research activity)	78.4	21.6
C2b.	Various information (Literature review/Citation/Quotation)	73.4	26.6
C2c.	Specific terminology used in a project report	63.8	36.2
C2d.	How to collect data (Methodology)	74.9	25.1
C2e.	How to construct questionnaire or interview questions (Instrumentation)	71.9	28.1
C2f.	How to analyse data (Data analysis)	74.4	25.6
C2g.	How to interpret data (Result/Findings)	78.4	21.6
C2h.	Language elements (eg. grammar, capitalization and punctuation)	77.4	22.6
C2i.	How to write list of references (eg: APA style/ IEEE)	65.3	34.7

5. Conclusions

This study has offered a small contribution to the perspectives of Malaysian polytechnic engineering students' need on a new module which provides skills in writing technical report. Specifically, the findings revealed that the content on how to carry a project and writing exercises were found insufficient in the current module used in English language courses at Malaysian polytechnic. In conclusion, a list of writing elements on technical research report is suggested to be included in the new module which is to be proposed to the system of education in Malaysian polytechnic. Relevant supplementary information and exercises could inspire and grow interest for the students to carry out the project successfully. In consequence, study in investigating the need of a new module on technical writing skills among engineering students should be conducted at other polytechnics to indicate perspectives from other students of other polytechnics in Malaysia and largely to other technical institutions with the intention to raise the quality of written work prepared by future engineering personnel.

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