

# **Needs analysis of English for mechanical engineering students in the Vietnamese context**

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## **Abstract**

*This paper reports findings from the questionnaire for mechanical engineers as a part of a doctoral study which included interviews and observations. Its purpose was to examine real-world uses of English as required by mechanical engineers to function effectively in their job at various workplace contexts in Vietnam. The questionnaire was framed in relation to the Communication Needs Processor (CNP) model proposed by Munby (1978) to study English communication needs of mechanical engineers from a sociolinguistic perspective. Findings revealed that English language skills of listening, speaking, reading and writing were important for mechanical engineers to perform their work effectively. Of these, listening and speaking skills were more important as they were the most frequently used ones. These skills were also perceived as the most lacking skills. The focus of the study was to inform course design by exploring how language is used in the work site. Moreover, it focused on the investigation into the complexity of English use in the various workplace contexts where communication interactions take place such as the dynamics of English language use, power relationships and formality.*

**Key words and phrases:** mechanical engineer, English language skills, workplace, communication, and communicative events

## **Introduction**

This paper reports a part of questionnaire findings in a needs analysis study of English for mechanical engineering students in the Vietnamese context. Participants were mechanical engineers from 4 different companies in the centre north and north provinces in Vietnam. These companies differed in terms of ownerships so that the study could capture a full picture of how English was used by mechanical engineers. The survey focused on investigating the English communication needs as perceived by mechanical engineers themselves, namely the kinds of English they used, the frequency of these uses, how they used, and in what situations. In addition to this, it examined whether social dimensions such as social status and power relationship might affect mechanical engineers' use of English. Finally, it sought suggestions from professional mechanical engineers for better ESP course preparation at tertiary level.

## **Literature review**

Needs analysis has long been considered of crucial importance not only in English for Specific Purposes (ESP), but also in general English courses. It is "the process of determining the needs for which a learner or group of learners requires a language and arranging the needs according to priorities"(Richards & Schmidt, 2010, p. 389). Hutchinson and Waters (1987) argue that any English course should be based on an analysis of learners' needs, and other theorists from this period and more recently have agreed that needs analysis is a prerequisite for devising and developing courses, as well as the development of syllabuses and materials (Brown, 1995; Dudley-Evan & St John, 1998; Hutchinson & Waters, 1987; Jordan, 1997; Long, 2005).

So far, there have been a substantial number of studies in needs analysis within the field ESP and language use in the workplace which will be discussed in the following section. Ab.Rahim (2008) conducted a needs analysis study to investigate the English language communication skills that the practising engineers need at the workplace. The study was motivated by the fact that many Malaysian graduates are lacking in soft skills (the use of English language and the communication ability) required by employers. Findings showed that more time should be devoted to oral and writing communication to help the engineering undergraduates meet the requirements at the workplace; reading materials such as technical reports, user manuals, etc. are important for effective communication, and that practicing engineers usually communicate with customers and this makes them to use speaking and listening skills to the best of their ability. Beside, practising engineers needed real life experience such as group meetings and public speaking so verbal skills are important to them. Finally, the study found out a need to design a more in-depth communication syllabus for engineering undergraduates, and this syllabus should focus on developing and improving students' speaking and listening skills to prepare for their future jobs.

Kaewpet (2011a) conducted a study to examine the communication needs of Thai civil engineering students. The results revealed that student's needs are various and it is very important to conduct a learning needs analysis to prepare for any ESP course.

Salehi (2010) investigated the English language needs of engineering students. Findings showed that Sharif students needed more speaking tasks in the curriculum, translation was not considered important for their future jobs, or technical writing was of crucial importance but no attention was paid to in their curriculum. Venkatraman and

Prema (2007) conducted a needs survey of English language skills for engineering students. Results showed that listening skills (category 1) and professional speaking skills (category 5) were ranked the highest, following by speaking skills, reading skills and professional writing skills. Other remaining skills received lower ranks.

In another study, Al-Tamimi and Shuib (2010) investigated the English language needs of Petroleum engineering students at Hadhramout University of Science and Technology in Malaysia. The study aimed to “identify the students’ perceptions of the frequency of English language skills used, the importance of these skills, their ability in performing the skills, the areas of language use that they need training/ teaching in, and their preferences for the English language course” (Al-Tamimi & Shuib, 2010, p. 1). The findings claimed the importance of English for petroleum engineering students at HUST who had low competence in English language (Al-Tamimi & Shuib, 2008a, cited in (Al-Tamimi & Shuib, 2010)). Students stated that they had to know many English language sub-skills to perform effectively in the target situation. They also indicated that they did not have adequate level of English ability, and therefore wanted to be offered more training to develop their English ability, especially speaking and listening skills. They thought that the current English language course should be removed and more time should be added to be proficient in English language.

Sattar and Zahid (2011) conducted a case study of the linguistic needs of Textile engineering students at National Textile University in Pakistan. 74 students and 4 English language teachers participated in a questionnaire survey which was developed and modified based on Munby’s model of Communicative needs processor. The findings revealed that there was a mismatch between teachers’ favourite teaching methods (grammar and translation methods) and student’s learning preferences (communication strategies) and favourite skills (listening and speaking skills). This study provided a clearer insight of ESL learners’ needs and ESL teachers’ preferences to syllabus designers which can help to develop more appropriate language courses and supplementary materials for students of textile engineering.

A new model to approach needs analysis namely the Common European Framework (CEF) was recently introduced by Huhta, Vogt, Johnson, Tulkki, and Hall (2013). The profile consists of target profession, occupational information, context information, the most frequent routine situations, the most demanding situations, and snapshots. It is an evidence-based approach to needs analysis which provides detailed instructions to apply in course planning and design. It provides a sample profile for mechanical engineers.

The literature search reveals no needs analysis research has been conducted in Vietnam to study the ‘real-world’ uses of English of mechanical engineers in the workplace. Thus, my study aimed to help address this gap and examined how social factors and social dimensions may affect the use of English in the workplace through a sociolinguistic and sociological lens. It answered the research question: **What kinds of real-world English skills are required by Vietnamese mechanical engineers to function effectively in the workplace?**

### **Method of data collection: The questionnaire**

Survey questionnaire was one of the three methods of data collection employed in the study. The questionnaire for mechanical engineers was framed in relation to the Communication Needs Processor (CNP) model proposed by Munby (1978), similar to

Kaewpet (2008) but with adaptations. It consisted of both closed and open-ended questions which were divided into three parts. Part one sought personal information of the participants. Part two aimed to find out their perception of English communication needs. Part three asked them to provide suggestions for the improvement of the ESP course for mechanical engineering students at university.

The participants were invited based on the following selection criteria:

- (i) They graduated from tertiary institutions; and
- (ii) They had at least one year's working experience as a mechanical engineer.

The questionnaire was piloted and necessary changes were made before distributing to the participants. A response of 71% was obtained when 100 questionnaires were distributed to mechanical engineers.

## **Findings and discussions**

Of the total 71 mechanical engineers who completed the questionnaire, 67 were male and four were female and 53 out of 71 were aged from 20 to 30. This showed the dominating role of male and their young age in the field. They held different positions, namely mechanical engineers, mechanical specialists, supervisors, technical staff, quality engineers, and managers. The multi-responses question about mechanical engineers' kinds of work demonstrated that they were involved mostly in manufacturing, maintenance, and design. More than half of the respondents studied General English and about one third studied the English for mechanical engineering course at university. Some had other English courses such as English language skills and short courses.

The study revealed the importance of English for mechanical engineers to function effectively in the workplace when 43.7% of the participants used English daily and 19.7% claimed that they used English several times in a week (see appendix A). In addition to this, nearly 90% of them agreed that highly effective mechanical engineers should have good communication skills in English. This is in line with the description of English as the international communication tool in engineering world (Kaewpet, 2011b), and the sake of work (Chia, Johnson, Chia, & Olive, 1999). Mechanical engineers in Vietnam needed English for daily and work communication in all kinds of company ownerships that they were working for.

Despite this importance, approximately half of those surveyed were not satisfied with their English ability, 30% expressed their satisfaction and 21% were slightly satisfied (see appendix B). Due to the high frequency of English use in their work, mechanical engineers generally needed all four English language skills (listening, speaking, reading and writing). Of these, listening and speaking skills were used more frequently (83% and 74.6%) but they were the ones that mechanical engineers lacked most (78.8% and 74.6%).

More specifically, the table below shows the ten most common out of 20 communicative events of mechanical engineers in the survey. This frequency was calculated by SPSS software version 19 and the mean was found. Based on the mean, the ten most common communicative events were 9 (reading products' specifications or descriptions), 20 (accessing information through the internet), 19 (communicating through emails), 8 (talking about everyday tasks and duties), 13 (reading online manuals), 1 (listening to English-speaking boss's instructions), 2 (listening to presentation and discussions in a meeting, seminar or conference), 11 (reading professional texts), 10 (reading textbooks) and 15 (writing technical reports).

<b>The average percentage (%) of the frequency of MEs' communicative events</b>							
<b>Communicative events</b>	<b>1-never</b>	<b>2-rarely</b>	<b>3-occasionally</b>	<b>4-some-times</b>	<b>5-frequently</b>	<b>6-daily</b>	<b>Missing *</b>
9. Reading products specifications/ descriptions	1.4	7	9.9	19.7	36.6	16.9	8.5
20. Accessing information through the internet	4.2	8.5	12.7	22.5	25.4	18.3	8.5
19. Communicating through emails	9.9	5.6	12.7	18.3	23.9	21.1	8.5
8. Talking about everyday tasks and duties	8.5	11.3	9.9	23.9	23.9	11.3	11.3
13. Reading online manuals	4.2	14.1	15.5	23.9	31	2.8	8.5
1. Listening to English-speaking boss's instructions	9.9	18.3	9.9	25.4	18.3	7.0	11.3
2. Listening to presentations and discussions in a meeting, seminar or conference	4.2	19.7	12.7	39.4	5.6	5.6	12.7
11. Reading professional texts, e.g. rules of practice, contracts	8.5	14.1	11.3	42.3	12.7	1.4	9.9
10. Reading textbooks	11.3	21.1	5.6	29.6	16.9	2.8	12.7
15. Writing technical reports	26.8	7	8.5	22.5	15.5	9.9	9.9

(\*-means the percentage of participants who did not answer this question)

The results, as shown in the table, indicate that these communicative events consisted of all four English language skills namely listening, speaking, reading and writing. Of these skills, reading skills were the most important for mechanical engineers. Most of them worked with machinery system including manufacturing, maintaining, repairing and designing which required them to know in details the products' specifications. If not, they would make mistakes in ordering spare parts and

installing devices. Beside they had to access information through the internet and online manuals to support their work which also required reading skills and vocabulary.

Zaid and Kamarudin (2011) found that more than 50% of the mechanical engineering students had problems with their communication skills in English. Speaking, as perceived by mechanical engineers in this study, was one of the most frequently used skills and was also the one that they lacked most and would love to improve. They needed this skill for everyday communication such as talking about their daily tasks and duties. In the context of their work, they had to work with foreign bosses, managers, supervisors and experts. For example, they had to listen to the managers' requests and instructions; they had to express their ideas or present their solutions to technical issues; they had to report their work progress or technical problems to their foreign supervisors and managers. Mechanical engineers also communicated with foreign suppliers and customers to discuss their businesses such as ordering spare parts and marketing the company's products. They could communicate via emails and telephone. Paralleled with speaking skills, mechanical engineers needed listening skills to fully function their communication. That is, they had to listen to the boss or manager's instructions, understanding presentations and discussions in meetings, seminars or conferences. In other words, they needed both speaking and listening skills to successfully carry out the communication. The same findings were reported in Kaewpet (2009) when civil engineers had to talk with English-speaking bosses in person, welcoming English-speaking visitors and taking the responsibility of the company international coordination and in Ab.Rahim (2008).

Written communication skills were described in previous studies (Ab.Rahim, 2008; Kaewpet, 2009). Though writing skills were perceived as the least frequently used, mechanical engineers needed them for email communication and writing technical reports. Email communication was used with both the management level and foreign business partners (customers or suppliers). This was to exchange work information, giving work requests, reporting work progress, ordering spare parts and reporting technical issues to the dealers or suppliers.

The findings exposed that mechanical engineers used Basic English and technical English for daily and work communication. They mainly used key technical words in their communication. Though they were aware of the importance of adapting their use of English for people of higher status, 37.9% of the participants' responses were informal English and 18.4% were colloquial English used in the presence of their boss because they had little choice due to their low English ability. This was also because they wanted to make their communication brief, flexible and easy to be understood. For those who had better English ability, formal English was used as a way to show respect and politeness to their bosses or customers as well as suppliers.

According to these professional mechanical engineers, they needed all four English language skills, especially listening and speaking as they were working with modern technology, foreign bosses, managers, supervisors, experts and foreign customers and suppliers from different countries in the world. This showed the dynamics of English use and the varieties of different English accents spoken. In other words, mechanical engineers needed English for communication and technical English to function their work effectively.

In response to question 30 in the questionnaire, the respondents suggested that mechanical engineering students should prepare enough English for the workplace. From their real-world experience in the workplace, they said that universities should

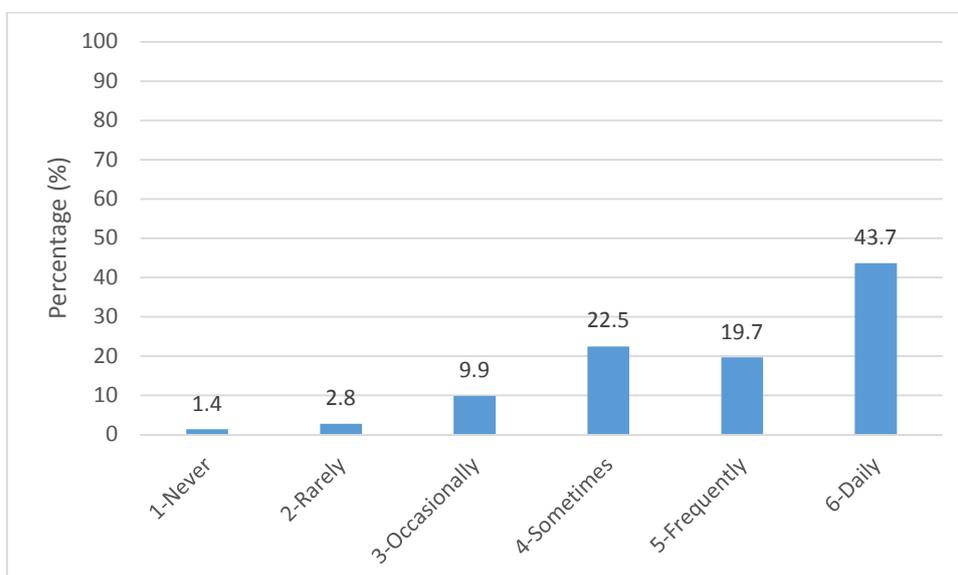
provide their students real-world situations of English use, more opportunities for students to access to the workplace (office and construction sites) for observations and meeting with foreign experts, and more training on technical English, especially technical terms and standards in mechanical engineering. Students should be familiar to different kinds of writing tasks such as technical reports and email communication; speaking skills such as technical conversations (safety talks, drawing presentations, proposal presentations); and real contexts of English use in the workplace (group meetings, morning meetings, and construction sites). Students should be able to interpret and understand differing types of world English such as Japanese English, Korean English, Indian English, Malaysian English, Israeli English, and Italian English because they will be working with foreign managers, supervisors and experts from different countries in the world.

## Conclusion

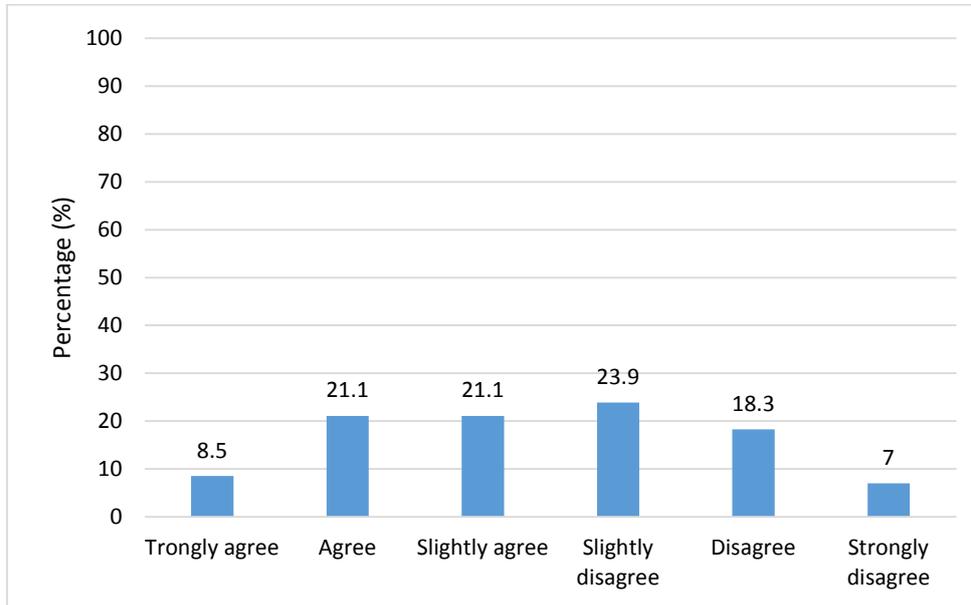
The findings of the study confirmed the importance of English language for mechanical engineers in the workplace. Since technical qualifications seem to be the same among graduates, English ability and communication skills in English are the only criterion that makes a difference among mechanical engineers. English language is considered as a “life skill” (P'Rayan, 2008) and communication skills in English should be incorporated in the profile of a modern qualified engineer (Venkatraman & Prema, 2007). The research showed not only realisation of sociolinguistics in terms of language skills and kinds of English language use but also that of sociology resulted in the communication interaction between mechanical engineers and their foreign bosses, managers, supervisors, experts, customers and suppliers. With clear statistical evidence and the insiders’ voice, the study provided practical suggestions for mechanical engineering students to better prepare their English for workplace use.

## Appendices

### Appendix A: Mechanical engineers’ frequency of using English



## Appendix B: Mechanical engineers' satisfaction of their English ability



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