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English for Specific Purposes Need Analysis among Final Year Chemical Engineering Students in a Malaysian Public University

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Abstract

Need analysis is a crucial part of English for Specific Purposes (ESP) that guides instructors to plan and design an appropriate course for target learners. As there is limited number of research on the needs analysis for engineering students in Malaysia, this study focuses on assessing and determining the ESP among engineering students in public university students in Selangor, Malaysia. The objectives of the study are to analyze the perspective of final year engineering students regarding their English language proficiency, language skills emphasized in their field and the perceived most important English language skill in the workplace. The data of this study were collected from final year chemical engineering students who have attended industrial training. An online survey questionnaire was adapted from Alsamadahi (2017) and was distributed to respondents via Google Form. The data was analyzed using SPSS and utilised descriptive analysis to summarize the findings. Based on the findings, the students perceive writing and reading as the most important skills in their field whereas speaking skills are the least important. The majority of respondents also perceived that they can perform the listening task on their own better compared to the speaking task. Overall, the results of the data analysis provide great significance to the ESP course design. It can be concluded that the study conducted can be improved if more samples can be collected from various universities.

Keywords: English for Specific Purposes, Needs Analysis, Engineering Students, Public University, Malaysia

Introduction

English for specific purposes (ESP) spans through a variety of different fields, including the engineering field (Isnin, 2018). As recent reports show that fresh graduates struggle with language proficiency, this affects engineering graduates as well (Ting et al., 2017). Therein the issue, the growing supply of engineering graduates' results in high competition within this field. Hence, it would be unfortunate to lose opportunities because of language restraints (Idris et al., 2012). Engineering is a field that heavily utilises English terminology (Kluensuwan,

2019). Hence, this preliminary research aims to gather and analyse data from chemical engineering students in a public university in Malaysia. The research aims to design an ESP course in helping engineering students in their language skills. The objectives of this study revolve around the perspective of final year engineering students regarding their English language proficiency (i), English language skills emphasized in their field (ii) and the perceived most important English language skill in the workplace (iii).

Literature Review

English for Specific Purposes (ESP) is a channel to provide courses to a field which requires certain English language needs to maximise productivity and communication purposes (Pazuki & Alemi, 2020). Then, the ESP course would be designed exclusively for the said field, to further develop the needed language skills. Therefore, ESP heavily relies on Needs Analysis in designing an appropriate course. Needs analysis functions as a guide for ESP instructors (Rajeswaran, 2018). In a nutshell, needs analysis is a big part of ESP. Consequently, ESP instructors must be aware or identify the form, structure and context of the language used in specific fields (Ciudin-Plesca, 2017). Moreover, ESP is essentially English instructions that apply to learners' needs in their field, which they have done in real life before. Overall, ESP has evolved, and the focus has shifted heavily on students' language needs. Hence, needs analysis requires learners' input to help the process of designing an ESP course.

Needs Analysis

Needs analysis in ESP comes in an array of approaches. However, for the purpose of this preliminary study, it utilises the target and present situation analysis (TSA and PSA). Both are best used in combination for a more complete analysis of learners' needs (Alsamadahi, 2017). TSA is generally what learners need from the language, for their field of work. This approach is used to identify the learners' perspective between the gap of their language ability and where they need to be (Poedjiastutie & Rifah, 2019). Whereas PSA identifies the learners' language background (Alsahamadi, 2017). Consequently, this provides the information for ESP instructors to understand the severity of the mentioned language ability gap. Consequently, they provide much more detailed needs analysis, in turn, allowing better decisions and more focused areas in an ESP course design. Essentially, needs analysis is the collection of input in creating a specific curriculum.

Engineering Field

There is a shortage of studies on the needs analysis for engineering students in Malaysia (Idris et al., 2012). This comes despite the importance of English within the engineering workplace (Saleh & Murtaza, 2018). Moreover, the issue is even more apparent when engineering workplaces emphasize more on English language skills rather than during tertiary level (Isnin, 2018). According to Saleh and Murtaza (2018), most engineering companies require a certain level of English proficiency as it heavily relates to report writings, meetings, and communication in their line of work. Previous studies have shown that fresh engineering graduates lack English vocabulary and confidence in their skills (Azmimurad & Osman, n.d). As reported by Ting et al (2017), employers have expressed that fresh engineering students do not meet the language expectations in the workplace. Common issues within engineering graduates are speaking and writing (Abrahim, 2008). Hence, it can be concluded that engineering graduates struggle with language production rather than language reception (Clement & Murugavel, 2015). This comes despite the Board of Engineers Malaysia's

recognition of speaking writing skills as heavy requirements for the engineering field (BEM, 2003). Therefore, the issue roots from tertiary level, as reported by Isnin et al (2018), only provides ESP courses in regards of presentations and discussions at surface level.

Methodology

This research utilises a quantitative research design method, specifically conducting a survey. Since this is a needs analysis, a quantitative research design is appropriate in the collection of data. Needs analysis is typically associated with quantitative design, as it employs survey methods as a primary form of identifying learners' language needs. Moreover, for the purpose of needs analysis, the sample size is also typically larger, to gather information of a particular field which in this case is chemical engineering in a Malaysian public university. Hence, this method enables the researchers to identify learner perspectives on their language abilities along with what they lack through a series of structured closed and open-ended questions.

Population

The sample refers to the portion of a population, which will then be a representation of the said population. Therefore, the sample is a segment within the target population that the researcher aims to study considering generalizing the population. Therefore, this research employed convenience sampling. This method is a form of non-probability sampling, where samples are selected from the target population that is most accessible to the researchers.
The reason this sampling method was selected was that it is among the most appropriate for a preliminary study such as this. The questionnaires were administered to 20 public university students from the Faculty of Chemical Engineering, Selangor, Malaysia. The age range of respondents are from 20-26 years old, and they have at least basic experience attending industrial training. Based on non-probability sampling methods, the samples were chosen using snowball sampling where researchers get in contact with participants via other participants. Respondents were willing to volunteer to participate in the survey.

Instrumentation

This preliminary study employs a quantitative design that utilises the survey method. This method includes a questionnaire, which is commonly used in needs analysis. Therefore, a questionnaire was needed to be constructed. Since needs analysis' data collection is oftentimes similar and versatile, the questionnaire was not needed to be done from scratch. Consequently, a set of questionnaires was adapted from a previous study.

The questionnaire was adapted from Alsamadahi's (2017) article entitled "Needs Analysis in ESP Context: Saudi Engineering Students as a Case Study". Although this article is not in Malaysian context, its questionnaire was selected to be adapted because it aligns with this paper's research objectives. On top of that, Alsamadahi's (2017) study employed similar needs analysis approaches, which includes present situation analysis (PSA) and target situation analysis (TSA). Nevertheless, the questionnaire was ultimately altered and adjusted to fit the local context climate.

Essentially, the set of questionnaires was designed in accordance to collect the necessary data needed for this preliminary research. Despite its adaptation from a previous study, the items were still carefully constructed and tediously analysed to ensure every item would bring relevance to this needs analysis and the research objectives for the topic. The questions

ensured that the participants' responses would be useful for both PSA and TSA. Overall, the questionnaire had 53 items which are divided into four sections: The first section, A, refers to the demographic, B is the PSA section, C is TSA while section D is the learning preference. Each item in Section B & C utilizes a Likert type scale from 1 to 5. The selected items mainly assessed the students current and future language learning needs by ranking the main skills by their importance. For Section D, the analysis will be utilized for course design purpose, so it is not included in the data analysis.

Data Collection

The researchers conducted a quantitative design through a survey in order to collect the data from the respondents. The instrument used to gather such data from the study's sample is through an online survey. The researchers conducted the said online survey through a widely used and accessible online medium, Google Forms. The survey focused on gathering the participants' perceptions regarding their language abilities and their language needs for their specific field. Besides that, the survey was exclusively conducted on chemical engineering students in their final year because they had undergone or are currently going through their industrial training. The rationale for this is they would have a better understanding of the language needs required in their line of work. The researchers employed snowball sampling in which the questionnaire would be shared among mutuals and networks of the participants. The findings of data were analyzed in the form of frequencies, mean and standard deviation using Statistical Package for Social Science (SPSS) software.

Findings

The data were collected through the online survey from the 20 participants. It was then applied into the analytic software, SPSS. The quantitative method of data analysis used in this preliminary study is descriptive analysis. Descriptive analysis is a statistical form of summarizing and describing the collected data of the survey. This analysis basically provides an overview of the data, which typically relates the questionnaire's items to the research objectives. This analysis simplifies what is being investigated through a quantitative approach. Moreover, descriptive analysis aligns well with needs analysis, which makes it easier to determine participants' perspectives in terms of frequency and percentages of the overall sample data. The findings are presented according to the research objectives.

Section A: Demographic

The research involved a rather small number of participants for the research was intended for the course design of that particular ESP engineering students. The representation of gender are of 40% male (n=8) and female 60% (n=12). The age range of respondents consists of 50% (n=10) respondents from both the age range 25-30 years old and 21-24 years old.

English Proficiency

The participants were asked on their own perception of their English language proficiency based on the four skills of listening, speaking, reading, and writing. The finding is presented in Figure 1.

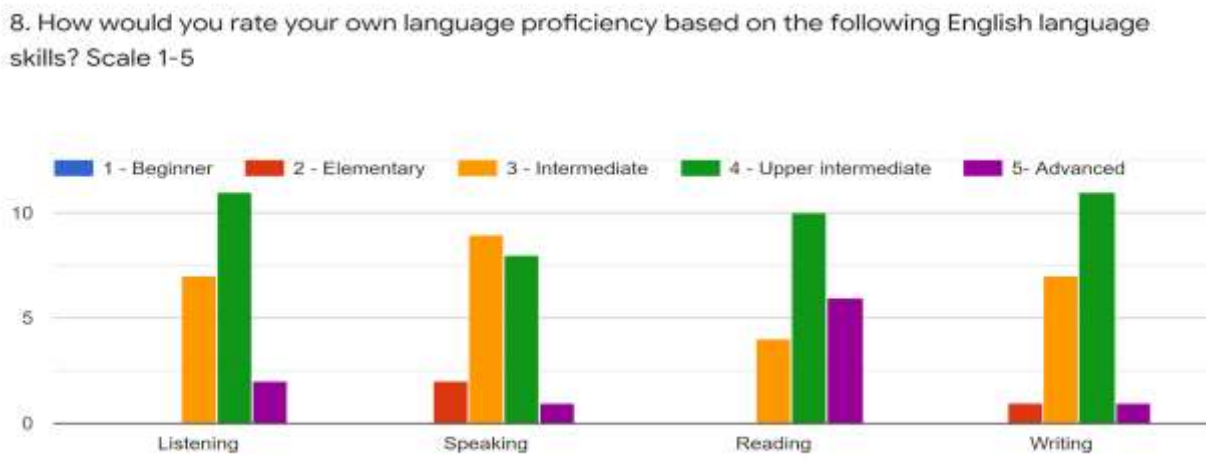

Figure 1: Students' perception of their proficiency in English language skills

Most respondents are between advanced and intermediate levels for all skills. Only a few respondents perceived that they are at the elementary level. Respondents are dominantly at the upper intermediate level for listening (n=11), reading (n=10) and writing (n=11). As for speaking skills, most respondents are mostly at the intermediate level (n=9). This can be interpreted that most engineering students considered themselves as either independent or advanced users.

English Language Proficiency (CEFR)

Table 1

CEFR level based on MUET score

	Frequency	Percent
A2 (Band 3)	12	60.0
B1 & B2 (Band 4)	8	40.0
Total	20	100.0

Based on Table 1, before entering the engineering program, most respondents are at A2 level (60%) which is based on the score 'Band 3' according to MUET scale. The remaining respondents (40%) are at B1 or B2 levels which is equivalent to 'Band 4'. In conclusion, respondents are categorized as either basic or independent users. None of the respondents is considered advanced users prior to entering the engineering program.

Section B: Present Need Analysis

Respondents' Perception on Their Rate of English Language Proficiency based on tasks is presented in Table 2.

Table 2
English Language Proficiency based on tasks

		Mean	Std. Deviation
1	How would you rate your listening skill?	3.40	0.598
2	How would you rate your speaking skill?	3.15	0.489
3	How would you rate your reading skill?	3.55	0.510
4	How would you rate your writing skill?	3.15	0.587
5	How would you rate your grammar?	2.95	0.394
6	Listening for points during lectures (L)	3.20	0.523
7	Understanding and following instructions (L)	3.55	0.510
8	Keeping up and responding in Q&A sessions (L)	3.30	0.470
9	Following presentations and meeting skills (L)	3.30	0.470
10	Forming comprehensible and clear questions (S)	3.35	0.587
11	Contributing relative ideas into a discussion or brainstorming session (S)	3.40	0.502
12	Stringing clear, concise and understandable answers (S)	3.10	0.447
13	Presenting and keeping audience engaged (S)	3.15	0.670
14	Interaction skills with people of different work positions (S)	3.05	0.394
15	Searching for textbook based information (R)	3.45	0.510
16	Critically understanding journal articles (R)	3.10	0.447
17	Correctly answering formative assessments by instructor (S)	3.15	0.489
18	Understanding written instructions for assignments (R)	3.40	0.598
19	Scheming and scanning skills (R)	3.25	0.550
20	Note-taking during presentations (W)	3.30	0.470
21	Answering exam-oriented academic writing (W)	3.40	0.502
22	Completing assignments and homework (W)	3.35	0.489
23	Writing field-specific report (W)	3.20	0.523

* Listening (L), Speaking (S), Reading (R) & Writing (W)
*Scale 1-4 1= I can't do this at all,2=I can do this with a lot of effort, 3= I can do it with a little help, 4= I can do this on my own

Respondents' general rate of language skills in Item 1-5, most respondents scored the highest for reading skills (M=3.55, SD=0.510) whereas the lowest score is grammar (M=2.95, SD=0.394). This shows that respondents think they can perform better at reading skills rather than grammar. As for Item 6 until 23, the questions are based on tasks for each language skill listed. It can be observed that the highest mean score item is *'Understanding and following instructions (L)*' (M=3.55, SD=0.51) for listening skill activity whereas the lowest score is the item *'Interaction skills with people of different work positions (S)'* (M=3.05, SD=0.394) for speaking skill activity. This can be observed that the majority of respondents perceived that they can perform the listening task on their own better compared to the speaking task. The overall findings are coinciding with a study by Clement & Murugavel (2015) where they reveal that engineering graduates struggle with language production rather than language reception.

Section C: Target Need Analysis

Part of the information needed for the target need analysis is on how the participants rate the importance of certain tasks that they need to perform. This is presented in Table 3.

Table 3
English skills Importance for Internship Experience in Engineering Field

		Mean	Std. Deviation
1	Making telephone calls (L)	4.10	0.718
2	Participating in formal meetings (L)	4.25	0.786
3	Taking notes during meetings, conferences etc (L)	4.20	0.695
4	Reading reports, correspondence etc (R)	4.40	0.680
5	Reading instruction manuals, technical articles etc (R)	4.45	0.604
6	Writing business letters, emails etc. (W)	4.45	0.604
7	Writing reports (W)	4.45	0.686
8	Conversation and informal meetings in small groups (S)	4.10	0.852
9	Addressing an audience - giving presentations (S)	4.35	0.745
10	Working with others who speak English (S)	4.40	0.680
12	Travelling (visiting sites, airports, hotels etc.) (S)	4.25	0.716
13	Extended visits abroad including social contact (S)	4.35	0.812
14	Looking after English-speaking visitors (S)	4.40	0.680

*****Listening (L), Speaking (S), Reading (R) & Writing (W)
*****Scale 1- Not important, 2- Slightly important, 3- Moderately important, 4- Important, 5- Very important.

Based on Table 3, it was found that the items *'reading instruction manuals, 'technical articles', 'writing reports'* obtained the same value (M=4.45 and SD=0.064). The items are under the writing and reading skills. This depicts that respondents perceived that writing and reading skills are important compared to listening and speaking. Meanwhile, the least important skill is speaking as the mean scores are the lowest for the three items *'making telephone calls (L)'* (M=4.10, SD=0.718) and *'conversation and informal meetings in small group (S)'* (M=4.10, SD=0.852). Based on the data, this states that respondents think that the most important skill for the engineering field during their internship experience is writing and reading skills. However, this is supported by Abrahim (2008) as he states that recurring issues for engineering graduates are not only speaking but also writing. Furthermore, Azmimurah & Osman (n.d) agree that graduates have weak reading skills specifically in terms of vocabulary.

Conclusion

To conclude this preliminary study on the needs analysis for engineering students, it was found that participants have the highest regard regarding their English reading skills. They can interpret and understand texts involving reports and textbooks. However, not being in the language field or having much emphasis on it, they acknowledge their weakest language skill is grammar. Besides that, engineering students from this study also feel their listening skills do not require much attention as they feel competent enough with their abilities to listen to presentations and, understand and follow instructions clearly. Nevertheless, engineering students have some struggles with speaking, specifically interacting with people of different positions. They might lack tenor skills in this regard. The participants of this study perceive

writing and reading as the most important skill in their field whereas speaking skills as the least. However, according to the BEM (2003), the most important skills in the engineering field are speaking and writing. This information could either be outdated or unenforced strictly at the workplace. Hence, an ESP course designed for engineering students should include writing and speaking, as perceived by them.

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References

Aarif, F., Sapuan, A. F., & Isnin, S. F. Exploring Speaking Anxiety in Communicative English Classrooms at a Polytechnic in Malaysia.

Abrahim, S. (2008). A need analysis on the engineering undergraduates' communication skills. *Academic Journal UITM Pulau Pinang, 4(*2), 163-184.

Alsamadani, H. A. (2017). Needs Analysis in ESP Context: Saudi Engineering Students as a Case Study. *Advances in Language and Literary Studies, 8*(6), 58-68.

Arno-Macia, E., Aguilar-Perez, M., & Tatzl, D. (2020). Engineering students' perceptions of the role of ESP courses in internationalized universities. *English for Specific Purposes, 58*, 58-74.

Azmimurad, A. M., & Osman, N. Technical Vocabulary Size among Engineering Undergraduates According to Field of Study at Universiti Malaysia Pahang.

BEM, Board of Engineers Malaysia. (2003). Engineering programme accreditation manual. Retrieved 28 June 2014 from http://www.bem. org.my/eac/manual231003.pdf

Ciudin-Pleşca, G. (2017). The role of needs analysis in ESP curriculum design. In Noi tendinţe în predarea limbajelor de specialitate în contextul racordării învăţământului superior la cerinţele pieţii muncii (pp. 130-134).

Clement, A., & Murugavel, T. (2015). English for employability: A case study of the English language training need analysis for engineering students in India. *English Language Teaching, 8*(2), 116-125. doi:10.5539/elt.v8n2p116.

Gheorghe, C. M., Chirila, A. I., & Deaconu, I. D. (2017). What they believe, what they want: A needs analysis of electrical engineering students on teaching and assessment methods. In *2017 10th International Symposium on Advanced Topics in Electrical Engineering (ATEE) (pp. 45-50). IEEE*.

Idrus, H., Mohamed, N. A., and Baharom, R. (2012). Motivating engineering and technical students to learn technical writing by inculcating lifelong learning skills. *The International Journal of Learning, 18(*11), 191-201

Isnin, S. F., Mustapha, R., & Othman, W. M. (2018). Engineering students' perspectives on the need of a new module in technical report writing at Polytechnic in Malaysia. Journal of Engineering Science and Technology (JESTEC), 31-38.

Pazoki, J. S., & Alemi, M. (2020). Engineering students' motivation to learn technical English in ESP courses: Investigating Iranian teachers' and students' perceptions. *RELC Journal, 51*(2), 212-226.

Kluensuwan, P., Chaisiri, T., Poomarin, W., & Rungruangsuparat, B. (2019). Needs Analysis of English for Engineering Staff in the Electronics Industry in Phra Nakhon Si Ayutthaya and Pathum Thani, Thailand. *NIDA,* 64.

Poedjiastutie, D., & Rifah, L. (2019). English Communication Needs of Engineering Students. *International Journal of Language and Linguistics, 7*(2), 69-77.

Rajeswaran, M. C. (2018). Approaches to Teaching English for Specific Purposes (ESP) in Engineering Programs. *IUP Journal of English Studies, 13*(3).

Saleh, N. S., & Murtaza, S. F. (2018). English language use in Malaysian government and private civil engineering workplaces*. International Journal of Education and Literacy Studies, 6(*3), 84-91.

Ting, S. H., Marzuki, E., Chuah, K. M., Misieng, J., & Jerome, C. (2017). Employers' views on the importance of English proficiency and communication skill for employability in Malaysia. *Indonesian Journal of Applied Linguistics, 7*(2), 315-327.