Needs Analysis for ESP Course Development for Undergraduate Engineering Students

A Cross-Sectional Survey for Engineering Students in One of Universities in Bandung

Intan Sinta Dewi Rahayu, Sudarsono M. I. Sudarsono, and Iyen Nurlaelawati
Universitas Pendidikan Indonesia, Bandung, Indonesia
{intansinta82.is, sudarsonobdg}@gmail.com, iyenn@upi.edu

Keywords: Engineering, engineering students, communication skill, target needs, necessities, lacks, and learning needs.

Abstract: This research is aimed at finding out the target needs, in terms of necessities and lacks, relevant to engineering work context, and investigating the learning needs as the route to meet the target needs. A cross-sectional survey as research design was employed. The data were gained from the semi-structured interview to three representatives of English lecturers for engineering and the questionnaire to ninety fourth-year engineering students in the Faculty of Engineering in one of universities in Bandung. The results reveal that engineering students' English proficiency has not met the target needs provoked by the majority lacks of communication skill, particularly speaking fluently and giving an oral presentation. With this in mind, some preferred-learning needs to overcome the lacks are the significance use of a good combination material, the use of internet as a media, working in a small group and in pair as learning partner, having a simulation related to engineering work context, problem solving, and an oral presentation.

1 INTRODUCTION

Currently, English language proficiency signifies predominantly not merely as a social life tool of communication, but also as a media of global market. Engineers, viewed as a change of economy of one nation (Leon, 2011), are highly urged to increase the range of English skills to maintain relevance with the global environment (Riemer, 2002). These engineers, according to Orr (2002) have the largest professional engineering organizations using English as their primary language in which most of the world's engineering publications are written in English and nearly all cooperative ventures with multinational participation choose English for their common language of communication. In this regard, competitive demands of government, industry and corporations, both national and international, for economic and technological progress, require a language that is effective and understandable within the economy and technology (Ellis & Johnson, as cited in Hossain, 2013). By considering English as a lingua franca in engineering education (Björkman, 2008), it can be inferred that the urge of possessing a good English proficiency should be more accentuated for engineering students in the ways of preparing their readiness prior to the entry of global job market, especially after the arrival of ASEAN Economic Community (AEC).

In fact, Indonesian engineers have not seemingly met the global demand due to the fact that only 124 Indonesian engineers were acknowledged and recognized by ASEAN in 2014 (Tempo.co online newspaper, 2014). One of the culprits is the poor English proficiency of Indonesian engineers as has been supported by the fact found by Education First (as cited in Araminta & Halimi, 2015) on the English Language Proficiency Index (English Proficiency Index) that Indonesia has been ranked 27th among the countries in Asia with a score of 53.31 and has been categorized as having low proficiency in English. The struggle to face the global job market has been further depicted in the current situation in which most of engineering fresh graduates in Bandung find an additional English course for the sake of job-looking provoked by their weak English proficiency background gained in the university.

With regard to the obstacles, some specific studies in the areas of ESP for engineering have been conducted in some non-native English speaking

Rahayu, I., Sudarsono, S. and Nurlaelawati, I.
Needs Analysis for ESP Course Development for Undergraduate Engineering Students - A Cross-Sectional Survey for Engineering Students in One of Universities in Bandung.
DOI: 10.5220/0007164501980205
In *Proceedings of the Tenth Conference on Applied Linguistics and the Second English Language Teaching and Technology Conference in collaboration with the First International Conference on Language, Literature, Culture, and Education (CONAPLIN and ICOLLITE 2017) - Literacy, Culture, and Technology in Language Pedagogy and Use*, pages 198-205
ISBN: 978-989-758-332-2

countries, including Indonesia. One of the studies analyzing the English needs of engineering students of Indonesia University in Indonesia by Araminta and Halimi (2015) revealing the results that students' needs of English language learning are considered not as high as their needs of English language use. However, the study lacks of providing specific learning needs in the form of some effective ways of learning English to meet the target needs of engineering students, as advocated by Hutchinson and Waters (1987) that it is pivotal to investigate learning needs of learners as the starting point to make the route in reaching the destination, which is, target needs.

Therefore, this research is aimed to investigate the target needs in terms of necessities and lacks in the relevance to engineering work context. Besides, this research is aimed to find out the learning needs with regard to the route how engineering students meet the target needs through effective ways of learning.

2 LITERATURE REVIEW

2.1 Needs Analysis

Needs analysis is "the corner stone of ESP and leads to a very focused course" (Dudley-Evans & St. John, 1998, p. 122). As the learners' needs can be much more varied and the range of language and skills is less predictable, Hutchinson and Waters (1987) claimed that the interpretation of needs can vary depending on the respondents' perception. Another core of need analysis is as needs analysis is not a once-for-all activity, the need to conduct the continuing process of needs analysis, in which the conclusion interpreted are constantly checked and re-assessed, are significantly suggested. To be specific, the element analyzed in needs analysis in terms of target needs and learning needs will be elaborated as follows.

2.2 Target Needs

What are analyzed in needs analysis is commonly known as target needs, the term postulated by Hutchinson and Waters (1987). Hutchinson and Waters defined target needs as what the learner needs to do in the target situation. In this research, the target needs is what engineering students need to do in the engineering workplace in the relevance with global job market. Target needs is looked at the target situation in terms of necessities, lacks, and wants. First, necessities are the type of need determined by the demands of the target situation; which is the learner has to know in order to function effectively in the target situation. Besides understanding the content, the learners also should learn the linguistic features, discoursal, functional, structural, and lexical, commonly used in the identified situation. Analyzing necessities is a matter of investigating what situations the learners will need to function in and then analyzing the constituent parts of them. Second, in the light of needs of particular learners, merely identifying necessities are not enough. Finding out what the learners have already known is important so that the necessities the learners still lack are easily identified. The target proficiency is significant to be matched with the existing proficiency of the learners. The gap between the two can be defined as the learner's lack. Third, wants are learners' view of their needs in the target situation. Here, the learners build their images of their needs on the basis of data relating to themselves and their environment. In the limitation to these three target needs, this research investigated the two target needs, namely necessities and lacks. Wants were not observed since as Hutchinson and Waters (1987) claimed that the learners' view will be possible to conflict with the perceptions of other interested parties: course designers, sponsors, teachers who already know the target situation relevant with the current work demands.

2.3 Learning Needs

Determining the starting point (lacks) and the destination (necessities) is not enough to reflect target situation needs. Since it is crucial to also consider the route; that is, how are the learners going to get from the starting point to the destination. This indicates another kind of need which is learning needs, in other words, what the learners need to do in order to learn. Learning needs is further defined by Dudley-Evan and St John (1998), as language learning information about the learners corresponding to effective ways of learning the skills and language in the learning process.

2.4 English Demands at the Engineering Workplace

The advent of AEC, making a single free trade market for ten ASEAN countries, including Indonesia, causes tough competition among engineering graduates. Apart from predominant knowledge, engineering workload has changed from merely engineering to managing, discussing, and negotiating

with various professions (Fonanov, Sidorenko, and Zamyatina, in Rajprasit, 2014). Engineers should be well-qualified in various excellent skills, including communication, decision-making, and teamwork. Notably, engineering graduates with knowledge and technical know-how and acquiring an excellent standard of communication skills will have a bigger chance to be hired (Riemer, 2002). One of well-known companies, Nestle, has made the easiest and the cheapest way to approach the language problem in the company by hiring people already possessing the required skill Lester (as cited in Feely & Harzing, 2002). The bigger the company is, the more communication skill is needed. As classified in Hutchinson and Waters' (1987) framework, the language will be used based on three settings, namely physical setting, human context, and linguistic context.

Some communicative events mostly run by multinational companies, have been investigated in several studies. The engineers have to deal with the tasks, which require more English: a) writing emails, minutes, reports, project proposal, business letters, memos and presentation slides; b) speaking with customers on occasional visits, talking about everyday tasks and duties, communicating via teleconference, communicating on telephone (Kassim and Ali, 2010), giving oral presentation (Thanky, 2014; Keane & Gibson, 1999), attending meetings or seminars (Dudley-Evan & St. John, 1998), and having informal and social conversations; c) reading written instructions or advice, manuals, project documents, office documents and professional texts; and d) receiving spoken instructions or advice, and listening at international seminars or conferences (Rajprasit, 2014).

Another study of the role of English for engineering students has been conducted by Latha (2014). The result revealed that effective English communication is the uttermost required skill in the recruitment process, especially in multinational companies. Effective communication means that essential communication in the form of verbal or written, e-mail or a random talk or exchange of ideas formally or informally either in a personal meeting or telephone with peers, superiors and others should be engaged to build rapport with them.

3 METHODS

To conduct needs analysis, there is no single approach for needs analysis in foreign language teaching (Hossain, 2013) as supported by Hutchinson and Waters' (1987) view that the choice of method will depend on the available time and resources and the procedures of each will depend on the accessibility. In this research, among other types of survey research, cross-sectional survey was used since it is aimed to find out community needs of educational services (Creswell, 2012). By cross classifying the aims of this research, the findings of necessities were gained from semi-structured interview to three representatives of English engineering lecturers in one of universities in Bandung.

On the one hand, the findings of students' lack of their English proficiency and learning needs were obtained from the questionnaire, administered to 90 fourth-year engineering students in the Faculty of Engineering, including Industrial Engineering, Food Technology, Mechanical Engineering, Informatics Engineering, Environmental Engineering, and Urban and Regional Planning. This sample size was drawn from the population of 864 fourth-year engineering students by embracing proportional stratified sampling (Yamane, as cited in Riduwan and Kuncoro, 2013) so that the proportions in the sample are created to be the same as the proportions in the total population on certain characteristics (Johnson & Christensen, 2014).

To find out the students' lacks, the questionnaire was adapted from the constructs of Present Situation Analysis of engineering students' English proficiency in Araminta and Halimi's (2015) study. The items serve to find out the importance of English skill for students' future career, students' perception on learning English in the university, students' self-assessment of their English proficiency, and some job skills students prioritize to improve. On the one hand, to find out students' learning needs, the questionnaire was adapted from the framework of learning needs analysis by Hutchinson and Waters (1987). The items asked serve to investigate students' perception on effective ways of learning English in terms of learning partner, the use of media, and classroom activities; instructional materials; the time of English enrollment.

4 FINDINGS AND DISCUSSIONS

4.1 Target Needs

Target needs in this research are categorized into two, namely necessities and lacks.

4.1.1 Necessities

The following discussion includes the result of interviews with the three representatives of English lecturers for engineering in one of universities in Bandung, Indonesia. The findings of necessities are fragmented into some important points, namely the importance of English for engineering, professional English skills for engineers, the content areas of engineering context, English communicative events at the engineering workplace.

To begin with, the importance of English for engineering has been declared by all participants that possessing a good English proficiency for engineering students is very crucial for the sake of facing the global world, especially subsequent to the advent of ASEAN Economic Community (AEC) of which Indonesia is a member country, causing the increase of global job-looking challenge, particularly for Indonesian engineering graduates. This finding has similar view with Riemer (2002) that engineering graduates necessitate to increase range of English skills to maintain relevance with the global environment of the new millennium. The arrival of AEC, causing each national border open for free trade area (Tien & Cuong, 2015) has caused the demands of applicants to have a high level of English proficiency increase (Choomthong, 2014).

In recognition of the scope of ESP, as stated by Steven (as cited in Dudley-Evan & St John, 1998) that "ESP may be restricted as to learning skills to be learned, for example reading only" (p.3), two of the participants argued that oral communication skill is the most predominant skill both in job recruitment and employment, as one of the participants argued that "Oral communication skill, because communication is very important. Because we have to communicate with the other. For example when they find the other companies from other country maybe I think communication is the key." (Personal interview, April 29, 2016). Besides, one of participants believe that oral communication is necessitated to transfer ideas resulting other people, in this context, work partners, do what is expected by the interlocutor, as the participant stated "… When we can't communicate well so how we can transfer our idea, our need of something, or our will." (Personal interview, April 29, 2016).

With this in mind, all participants said that engineers are not highly urged to speak with fully grammatical correctness. Mispronunciation is tolerated as long as it is spoken fluently and the message is still intuitively inferred. The importance of communication skill has also been viewed as the best career enhancer (Polack-Wahl, cited in Seetha, 2012), as fresh graduates are firstly hired (Lester, as cited in Feely & Harzing, 2002) and after sitting in a company to meet the current demands that indeed, engineers deal with the same theories of mathematics, mechanic and technology, however the modern engineer has to be able to communicate effectively in a shared tongue (Riemer, 2002), more frequently performed in explaining ideas, experiences, and co-operate in their professional, work especially in discussing work and problem solving (Shrestha, Pahari and Awasthi, 2015; Nylen and Pears, 2013; Latha, 2014).

By further going specific, all of the participants believed that oral presentation skill is highly required in the engineering workplace. Besides working in the field, they believed that engineers should also present something related to their work progress once it has been finished, for instance, presenting a report or a product they have been created.

In all participants' view, written communication skill, on the other hand, are not aggregately demanded due to its less frequent usage in the workplace, unless writing a report.

All of the participants claimed that indeed, engineers are required to write correct sentence and well-organized paragraph, however writing grammatically correct sentence sometimes is rarely demanded since engineers mostly deal with technical report with the numerical calculation. As one of the participants stated that "Not really, because technical report is usually numerical calculation, like in percentage, not really wordy, like social." (Personal interview, April 27, 2016).

Discussing the content areas of engineering context, all participants believed that engineering content is the utmost content which should be acquired by both the teacher and students. One of the best ways they do to keep update with the content is by enriching their knowledge in line with the latest development of technology relevant to particular focus of study. On the other hand, they claimed that General Business English is not predominant content for English for engineering as it is rarely performed in professional engineering context and commonly provided by other departments. They believed that an engineer is not the one who is responsible for making business or expand company's work unless they own the company or sit in high enough position in the company such as manager who deals with developing and expanding company's product nationally or even internationally.

In admission to the importance of engineering content, all participants deduced that compared to

other texts, including documents and business letter, one of the text most frequently performed as day-to-day routine in the professional engineering workload, containing lots of engineering content, is technical manual. As one of the participants alluded that engineers' job is always based on the operational standard as the procedure.

Last findings deal with some communicative events at the engineering workplace. First, all participants explained that using English communication in the work context depends on types of company, human context, and the relationship between engineers and co-operate workers. All participants believed that English is more predominantly used in a multinational company in the form of human context, particularly in an office, meeting, demonstration, and telephone. However, as all participants accentuated that those contexts likely perform depends on who engineers work with, the lower the worker's level in a company, such as a technician, the less English will be used due to their homogeneity in terms of local or national language.

In addition, according to all participants, by noticing technical manual mostly written in English, compared to other communicative job skills, reading and writing technical manual or instructions in English is most commonly met by engineers. By cross classifying the aforementioned types of company, human context, and relationship between engineers with co-operate workers or clients, all participants categorized these several communicative events into frequently used in English by engineers at the workplace, including giving an oral presentation and face-to-face discussion, reading and writing report, and problem solving. In the contrary, for these two communicative events including reading and writing official business letter and reading and writing email, are mostly run by office administrators or other position in the company related to business.

4.1.2 Lacks

To examine how far engineering students meet the necessities, it is pivotal to know the gap between the students' present English proficiency and some required-professional English (Hutchinson and Waters, 1987) through questionnaire administered to 90 fourth-year engineering students. The items asked in the questionnaire include the importance of English skill for students' future career, students' perception on learning English in the university, students' self-assessment of their English proficiency, and some job skill students prioritize to improve.

The findings revealed that the importance of English enhancing students' future career is due to different purpose. Students already have an awareness of the importance of English for the sake of succeeding their future plans of career including studying abroad (21.11%), working at multinational company (21.11%), working at international company (17.78%), working abroad (12.22%), working at national (4.44%). In fact, since many of them planned to extend their study abroad, English takes on a service role to lead them easily to specific needs in study, work, or research for the sake achieving the summit of success in their endeavors (Rao, 2014; Shrestha, Pahari, & Awasthi, 2015).

In addition to their perception on learning English in the university, the majority of the students (62.22%) admitted that they found it rather difficult to learn English, specifically some English subjects they have learned in the university. The result of this perception was caused by several reasons including difficult to convey ideas, difficult to use verb, difficult to memorize words, difficult to understand the unclear material delivered by the lecturer. Many of the students (24.4%) acknowledged that learning English in the university was easy. The most common reason resulting their easiness in learning English include the easiness of learning Basic English and the easiness to find English material for learning. A few of the students (10%) thought that it was difficult for them to learn English subjects in the university. Some of them (3.3%) considered that learning English subjects in the university was very easy since they used to use English in daily life and they understand English easily.

The next findings concern on revealing students' English Proficiency based on their self-assessment. Overall, most of the students have been already good at reading, especially at understanding main ideas (61.11%) and at skimming for content and meaning (50%). In the relation to work context, although receptive skills both reading and listening are mostly engaged in independently capability, in the contrary, it results less emphasized in the nature of their work (Kassim & Ali, 2010), however their good reading skill is still believed can carry them out to professional engineering workplace, especially skimming and scanning as the first stages for identifying whether to read a document or which part to read carefully then extracting the meaning (Dudley-Evan & St. John, 1998).

In the contrary, merely possessing a good grasp at reading is not sufficient to be a professional engineer in the 21st century. In fact, the majority of them acknowledged still poor at writing, specifically at

producing analytical, coherent, and cohesive writing (72.22%). In the reflection of this finding, students' lack of producing analytical, coherent, and cohesive writing will probably not trouble them in the engineering work context as long as engineers can evolve concepts and resolve problems in both spoken and written form without language barrier (Feely & Harzing, 2002). They do not need to worry their weakness since the written form most frequently engineers work with are report with numerical calculation.

Surprisingly, the high number of them (71.11%) rated themselves as poor at speaking fluently and at oral presentation (64.44%). Compared to writing skill, the students' lack of speaking fluently and oral presentation skill should be more accentuated since these two skills are part of communication skill, the most significant skill in the engineering workplace (Thanky, 2014; Keane & Gibson, 1999; Illing, as cited in Riemer, 2002; Polack-Wahl, as cited in Seetha, 2012). It implies that without fluency of speaking and good delivery of oral presentation, the engineering graduates can be less prioritized to be hired in the company recruitment process as one of the multinational companies, Nestle, merely hire the instant engineer already possessing the required skills to solve the language problem in their company (Lester, as cited in Feely & Harzing, 2002).

Moving on to some job skills that students prioritize to improve in order succeeding them at engineering work, the highest five rank, including oral presentation, face-to-face discussion, problem solving, telephone conversation, and reading and writing report are the job skills the students prioritize to improve. It is quite astonishing however, the majority of the students less prioritize reading manual by putting it on 8th rank due to their good reading skill as discussed earlier. In fact, according to Rajprasit (2010) and Kassim and Ali (2010) a manual is a kind of engineering task mostly written in English.

4.2 Learning Needs

As learning needs is defined as a language learning information describing effective ways of learning the skills and language in the ESP class (Dudley-Evan & St John, 1998), in the form of the questionnaire, the findings were obtained from students' perspectives towards their learning needs in order to meet their immediate goal in learning English, These are scoped into some findings in terms of the material, the time of course enrollment, the prioritized time of learning English, learning partner, the use of media and learning activities. For the three former scopes, students answered 3 multiple questions. For the three later scopes, on the one hand, students were given 16 criteria and asked to rate them using qualitative scale, namely "Really Suitable", "Suitable", "Rather Suitable", and "Not Suitable", which were converted into 4 to 1 score.

In terms of the material of English for engineering, more than a half of students (54.44%) expressed the material should be in a good combination of these several kinds of material including course content (such as textbooks, instruction/manuals, CDs, DVDs, videotapes), job materials (such as work forms, figures, and samples of relevant course assignments and students' paper), and material from website (such as business letter, dialogues, instructions, telephone conversation related to work context). In what mentions, Harding (as cited in Maria, 2009) suggested ESP teachers to not merely follow an off-the-shelf course or course book, the materials should be authentically varied and fun relevant with the use of contexts, texts, situation from engineering subject area.

In relation to the enrollment of English, many of the students (35.56%) chose the 1st and 8th semester as the best time to enroll English subject in the university. The extent to which findings, most of the students (35.56%) were flexible of time decision when an English class will be conducted.

In terms of learning partner for learning English, most of the students (51.11%) admitted they felt suitable to work with a small group and work with another students (50%). Their preferences are well-matched with the cooperation circumstance in engineering work context since most engineers, in fact, predominantly work with in teams (Riemer, 2002) or co-operate workers in their professional work especially in a work discussion and problem solving (Shrestha, Pahari, & Awasthi, 2015; Nylen & Pears, 2013). As McCabe, Pantazidou, and Philips (2012) emphasized that notwithstanding their diverse skill levels, work ethics, and personality traits, their ability to work well with their team members feasibly influence their performance evaluation more than their technical skills.

In terms of the use of media, half of the students (50%) admitted that they were very suitable to use internet to learn English. The power of using internet as the learning media for engineering is supported by Maria (2009) that by using the internet, learners are encouraged to be independent, creative, and autonomy in using and developing sills such as analyzing, synthesizing and evaluating, collating and

organizing information, and interpreting language for meaning.

In terms of learning activity, most of the students (56.67%) feel suitable to have a simulation related to engineering context, to conduct problem solving (51.11%) and to give an oral presentation (48.89%). First, Pritsker (as citied in MacNair, Musselman, & Heidelberger, 1989) believed that simulation, mostly used and useful technique of industrial engineers and operations researchers, works because it deals with the reality. Simulation related to real activities at work is further suggested by Zhang and Zhang (2011) to be implemented as one of classroom activities in the context of teaching engineering. Those activities can be new product explanation meeting and customer requirement collection and so on to which the active reaction responding to the question in listening and writing form must be raised in natural condition. Second, problem solving as suggested by Raviv (2004), incuding team-based, interpersonal, and individual hands-on activities enhances engineering students' creative thinking and self-exploration of problems and solution. Additionally, due to the fact that problem solving skill is predominantly accentuated by a company (Riemer, 2012), problem solving has been believed as the most important need in the ways of seeing clearly how the emphasis of the content-focused group is on transmission of skills (McCabe, Pantazidou, & Philips, 2012). Third, regarding oral presentation, Riemer (2002) suggested to allocate class projects for presentation for the reason it can encourage and enhance the interpersonal skills of the students. Another suggestion to conduct presentation in ESP classroom is further encouraged by Maria (2009) as engineering students can practice vocabulary related to their field and give them the chance to do relevant research.

5 CONCLUSION AND RECOMMENDATION

In brief, the needs analysis conducted in this research has revealed the target needs, in terms of necessities and lacks of undergraduate engineering students in one of universities in Bandung, Indonesia. The results show that indeed, students have already had an awareness of increasing their range of English skills provoked by their different career plan, one of which is working at multinational company. However, most students lack of communication skill, particularly in speaking fluently and giving an oral presentation.

The gap between the necessities for engineers and the present condition of engineering students' proficiency has shown that students are not ready to face the global engineering labor market, especially subsequent to AEC, unless the improvement of the lack skill is increased. These lacks, being drawbacks for their career should be addressed immediately. To ESP practitioners or teachers, some preferred-learning needs and valuable findings are useful to be a concern on evaluating and developing instructional material and planning in line with students' motivation of keeping update on their range of global demands. Another win-win solution that should be highly affiliated by the department is the cooperation between the department and some particular companies or alumni already sitting in a company, particularly multinational company, to have sharing session in terms of target needs

REFERENCES

Araminta, L. D. W., & Halimi, S. S. 2015. Asean Economic Community 2015: needs analysis of Universitas Indonesia's engineering students. *Indonesian Journal of Applied Linguistics, 5*(1), 10–17.

Björkman, B. 2008. English as the lingua franca of engineering education. *Nordic Journal of English Studies, 7*(3), 11–17.

Choomthong, D. 2014. Preparing Thai students' English for the ASEAN Economic Community: some pedagogical implications and trends. *Language Education and Acquisition Research Network (LEARN) Journal, 7*(1), 45-57.

Creswell, W. J. 2012. *Educational research: planning, conducting and evaluating quantitative and qualitative research (4th Ed.)*. Boston: Pearson Education, Inc.

Dudley-Evans, T., & St John, M. J. 1998. *Developments in English for Specific Purposes: a multi-disciplinary approach.* Cambridge: Cambridge University Press.

Feely, J. A., & Harzing, W. A. 2002. Language management in multinational companies. *Cross-Cultural Management: An International Journal*, 1-26.

Hossain, J. 2013. ESP needs analysis for engineering students: A learner centered approach. *Journal of Presidency University*, *2*(2), 16–26.

Hutchinson, T., & Waters, A. 1987. *English for Specific Purposes: a learning-centered approach*. Cambridge: Cambridge University Press.

Johnson, B. R., & Christensen, L. 2014. *Educational research: quantitative, qualitative, and mixed approaches (5th Ed.)*. The United States of America: SAGE Publications, Inc.

Kassim, H. & Ali, F. 2010. English for English communicative events and skills needed at the workplace. Feedback from the industry. *English for Specific Purposes*, *29*(3), 168–182.

Keane, A., & Gibson, S. I. 1999. Communication Trends in Engineering Firms : Implications for Undergraduate Engineering Courses. *International Journal of Engineering Education, 15*(2), 115-121.

Latha, K. 2014. Role of English language for engineering students. *American International Journal of Research in Humanities, Arts, and Social Sciences, 7*(2), 122–123.

MacNair, E. A., Musselman, K. J., & Heidelberger, P. 1989. Why simulation works. *Proceedings of the 1989 Winter Simulation Conference,* 1-6.

Maria, P. O. 2009. Techniques of teaching English for engineers. *Proceedings of the 9th WSEAS International Conference on DISTANCE LEARNING and WEB ENGINEERING,* 44-47.

McCabe, B., Pantazidou, M., & Philips, D. 2012. *Shaking the foundation of Geo-Engineering education*. London: CRC Press.

Nylen, A. & Pears, A. 2013. *Professional communication skills for engineering professionals*. Sweden: IEEE.

Orr, T. 2002. Assessing proficiency in engineering English. *Professional Communication, IEEE Transaction, 48*(1), 40-44.

Rajprasit, K., Pratoomrat, P., Wang, T., Kulsiri, S., & Hemchua, S. 2014. Use of the English language prior to and during employment : experiences and needs of Thai novice engineers. *Global Journal of Engineering Education*, *16*(1), 27–33.

Thanky, P. 2014. Importance of English and Communication Skills for Technical Professionals. *International Journal of Scietific Research*, *3*(4), 211–212.

Rao, V. C. S. 2014. English for Science and Technology: a learner centered approach. *English for Specific Purposes World, 15*(42).

Raviv, D. 2004. Hands-on activities for innovative problem solvings. *Proceedings of the 2004 American Society for Engineering Education Annual Conference and Exposition.*

Riduwan, M. B. A., & Kuncoro, A. E. 2013. *Cara menggunakan dan memakai path analysis (analisis jalur)*. Bandung: Alfabeta.

Riemer, M. J. 2002. English and communication skills for the global engineer. *Global J. of Engng. Educ., 6*(1), 91-100.

Seetha, S. 2012. Communication skills for engineers in global arena. *International Journal on Arts, Management and Humanities, 1*(1), 1-6.

Shrestha, N. R., Pahari, R. B., & Awasthi, R. J. 2015. Impact of English on the career of engineering students: a brief overview in g (local) context. *Journal of the Institute of Engineering, 11*(1), 182-188.

Tien, N. Q. & Cuong, N. C. 2015. English language teaching and learning in ASEAN countries and preparatory steps to integrate into the ASEAN economic community (AEC) 2015. *International Integration, 24*(34), 94-100.

Zhang, L., & Zhang, C. 2011. *Engineering education and management*. Berlin: Springer-Verlag.