# Core Language Skills Significant Among Engineering Graduates to Succeed in the Global Workplace[1]

## Kimberley Migallos[2] & Jose Cristina M. Parina[3], De La Salle University,

## Manila, Philippines

## Abstract

The study aimed at identifying the core language skills regarded as most significant in the academe and eventually in the workplace among engineering graduates. The study surveyed tertiary students to identify their perception of the skills needed upon graduation, together with the kind of instruction that would improve and progress the said skills. An interview among chosen professors was also conducted, together with in-class observations to provide more insights on the prerequisites that engineering graduates need to succeed, starting from job applications to full immersion in the field. The qualitative method applied showed that the most significant skills an engineering student/practitioner must acquire according to the survey among students are a) above-average writing and writing laboratory instructions and b) above-average listening skills that lead to an active speaking dialogue. The classroom observation shows that students are not inclined to participate in discussions and the interviews with the professors reveal that engineering students are not very competent orally and thus, speaking in their native language *Taglish* (Tagalog + English) should be allowed at the beginning until they become proficient in English. A pedagogical implication was provided together with a recommendation in addressing the possible gaps in the curriculum and methodologies.

## Resumen

El estudio tuvo como objetivo identificar las habilidades lingüísticas básicas consideradas como las más significativas en la academia y eventualmente en el lugar de trabajo entre los graduados de ingeniería. El estudio encuestó a estudiantes universitarios para identificar su percepción de las habilidades necesarias al graduarse, junto con el tipo de instrucción que mejoraría dichas habilidades. También se realizaron entrevistas con profesores seleccionados, junto con observaciones en clase para brindar más información sobre los requisitos previos que los graduados de ingeniería necesitan para tener éxito, desde las solicitudes de empleo hasta la inmersión total en el campo. El método cualitativo aplicado mostró que las habilidades más significativas que debe adquirir un estudiante/practicante de ingeniería son a) redacción superior al promedio y redacción de instrucciones de laboratorio y b) habilidades auditivas superiores al promedio que conducen a un diálogo oral activo. La observación en el aula muestra que los estudiantes no están dispuestos a participar en las discusiones y las entrevistas con los profesores revelan que los estudiantes de ingeniería no son muy competentes oralmente y, por lo tanto, se les debe permitir hablar en su idioma nativo taglish (tagalo + inglés) al principio hasta que lleguen a ser competente en inglés. Se incluyen implicaciones pedagógicas y una recomendación para abordar las posibles brechas en el plan de estudios y metodologías.

## Introduction

### Background of the Study

Engineering graduates have a great deal of pressure to not only acquire skills in technology, but also to perform in a global and multicultural society, as the demand for engineers with strong quantitative skills has grown exponentially in the 21st century. However, research has shown that although Eengineering graduates may not always lack their technical knowledge, their English language abilities are not always as good as what is expected. In today's professional practice, engineers must complement technical skills with critical skills through language courses (Kaewpet & Sukamolson, 2011) to be more effective in the global arena. Engineers are now expected to be more dynamic and more efficient in all language skills to succeed in their profession (Rajprasit et al., 2015). In their study, Kaewpet and Sukamolson (2011) explained that the demands for better English skills among engineering students are becoming more of a requirement for graduation to improve their performance in the profession, locally or abroad. However, writing skills seem to have been highlighted above all other macro skills. A study by Halim et al. (2012) investigated the motivational factors of engineering students and concluded that "writing in English for native English speakers may not become a problem. However, for non-native English speakers, writing in English may lead to major obstacles" (p. 28). So, it is important to take into consideration that non-native speakers will find

it more difficult to explain technical terms utilizing their L2 especially if they are not that proficient. Inefficiencies in writing, or in the use of English language, in general, was observed in most Asian countries. In the study of Beyene (2009, as cited in Spence & Liu, 2013) "globally distributed members of a high-tech organization found that not only did differing levels of English proficiency disrupt collaboration and information sharing, but informants also reported that English proficiency was a deeply felt concern for many of the people with whom [they] spoke (p. 98)." This suggests that in this time and age, technical skills are no longer sufficient. Engineering graduates should be able to seamlessly communicate with colleagues, superiors, and clients to better perform in the profession and carry out their practice in the global arena where English is usually the lingua franca.

De La Salle University in the Philippines was chosen for this study as it is among the Philippines universities included in the University Impact Ranking 2020 by Times Higher Education. This amounts to high expectations placed among its graduates, engineering not excluded. It also has one of the most proactive colleges that produce students that excel in robotics, that is the Gokongwei College of Engineering (GCOE). Research funding is highest for this college as it is encouraged to respond to the needs of both the industrialized and the rural areas in the country. Moreover, this is also the only college that received the highest accreditation from the Commission on Higher Education (CHED) and has been selected by the Association of Southeast Asian Nations (ASEAN) to be a part of the Southeast Asian Engineering Education Network. The university positioned the GCOE to significantly contribute to the leadership and innovation not only in engineering but also in related fields as well. This is a long-term plan of the University to aid the economy in its economic and social development. Thus, a research-focused institution that is tapped in the international arena is the fundamental goal for GCOE is envisioned.

## Gokongwei College of Engineering

The undergraduate population is almost entirely Filipino from a Filipino-speaking educational background where English is the medium of instruction. A needs analysis shows that the majority of students enter the GCOE with an intermediate level of English language proficiency. This level is perceived to be not enough if the college would like to pursue and retain world-class research projects that contribute to the vision of the ASEAN which was also upheld by Ong Keng Yong when he gave a speech at the at the 24th Conference of ASEAN Federation of Engineering Organisations (CAFEO). According to President Irandoust of AIT, it is important to "improve engineering services quality as well as facilitating the free flow of engineering professionals within the region" (Q and A with AIT President: ASEAN Affairs interview, 2017) It is, therefore, pertinent for GCOE graduates to not only be technologically advanced but to also be skilled in "oral presentations, conducting telephone conversations on technical and commercial matters, preparing reports on the laboratory experiments plus daily language demands such as reading and writing manuals, instructions, commercial letters and e-mails" (Kaewpet & Sukamolson, 2011, p.184). All these conclude how the ASEAN community advances an important attempt to support the labor movement with the Ministers of Economy of ASEAN countries expanding "the service coverage into several areas like nursing, architecture, medical, accounting, and engineering" (Poedjiastutie & Rifah, 2019, p. 69). All these efforts highlight that now, more than ever, oral and written English communication is an important skill to acquire in most professions, including engineering.

## English skills in the engineering field

Regarded as the fastest-spreading language in human history, one out of four people use English in their daily communication, and this has made it the international communication tool not only in business and trade but also in the field of engineering. To cite an example the CEO of Japan's largest online marketplace boasts about 25% of its employees can communicate in English with "partners and co-workers in foreign subsidiaries on a regular basis" (Neeley, 2012, para. 5).

This phenomenon is said to jumpstart and strengthen student exchanges. This is similar to South Africa which places English as crucial in the workforce despite the country's multilingualism. (Hill & Zyl, 2002. The study of Chen (2006) looked at how English should be more pronounced for learners in various disciplines to meet job-related needs. Indeed, English is slowly becoming an important skill when pursuing a career in engineering whether global or local in context (Shrestha, et al., 2016). Thus, those who refuse to improve this skill apart from their technical skill may have difficult time to progress in the profession.

Likewise, the demand for extensive oral and written communication is also high specifically in the field of engineering. Oral communication skills "has also been well documented as critical to engineering success within and outside of the classroom" (Linvill, 2019, p. 309). Results from an online survey-questionnaires

and semi-structured interviews in the study of Spence and Liu (2013) showed that "engineers face numerous English communicative events similar to other Asia-Pacific nations, including highly frequent writing and reading events such as email, reports, and memos, while common oral events include meetings, teleconferences, and presentations" (p. 97). In addition, engineers should also effortlessly and effectively connect through language use both in domestic and international environments (Accreditation Board for Engineering and Technology, 1998-2010; European Accreditation of Engineering Programmes, as cited in Kaewpet & Sukamolson, 2011). "In today's professional practice, engineers must complement technical skills with critical skills through English such as analyse other cultures' needs, and design products and services to fit those needs (p. 183)." If they want to promote themselves internationally, English language skills need to be honed to seamlessly learn about the target country's culture and practices.

In ranking the importance of the skills, "students ranked writing as their least competent skill and regarded speaking and writing as the most important skills needed to master the language" (Yasin et al., 2010, p. 162). Furthermore, according to Passow (2012), "engineering graduates considered a cluster of competencies such as teamwork, communication, data analysis, and problem solving significantly higher than contemporary issues, design of experiments, and understanding the impact of one's work" (p.95). Other research, such as that conducted by Clement and Murugavel (2015), reveal that engineers need more training in verbal English skills since employment becomes a problem for new graduates in engineering because of their lack of oral skills, coupled with lack of confidence in speaking. It is not enough in the 21st century for engineers to only be quantitatively, mechanically, and technologically advanced. Grünwald (1999) and Riemer (2002) also claimed that future engineers should be more sophisticated and versatile in their skills, and their pool of abilities should always include being able to communicate.

De La Salle University, as an academic institution focusing on research has always been inspired to be one of the world's leading advanced and innovative methodical universities. Therefore, there is a necessity to equip engineering students in language skills apart from technical ones, which they have consistently demonstrated based on its current ranking GCOE. This paper attempted to identify the perceived needs of Eengineering students in terms of language abilities and use, and the actual demand upon graduation. In doing so, the students' perception of what is important and needed to be honed in a language course was also identified, among other perceptions. This inquiry will hopefully allow the stakeholders, curriculum planners, professors, and students alike to visit the concept of a knowledge-sharing culture that brings them closer to the international professional community.

## Methodology

This study was based on Basturkmen's (1998) needs analysis of engineering students at Kuwait University. The present needs analysis of engineering students from the GCOE gathered data from three different sources namely: survey, observation, and interview.

### *Data Sets*

#### Survey

There was a total of 300 respondents from the different courses of the GCOE. Most of the respondents had already taken the first two English Courses. The survey-questionnaire (see Appendix 1) asked for a little background on their access to the English language prior to college. The respondents were then asked to rank the English skills that they deemed to be most to least important for an engineering graduate. Next, the respondents were asked to rank the importance of different tasks in their respective classes. The respondents were asked only to choose from 1-3, 1 being 'very important' and 3 as 'unimportant'. Next, the respondents were asked to evaluate their abilities and knowledge of various aspects of English, for example reading, writing, speaking, grammar, technical vocabulary, etc. Lastly, they were asked to evaluate their English language instruction. The data was analyzed by deriving the mean and standard deviation. The questionnaires used were the same for the two groups of participants in the study. The most recent insights of the participants were solicited through the needs assessment as adapted from Long, and Zhu and Flaitz as cited in Atai and Shoja (2011).

#### Observation

To carry out a more direct and in-depth study of the context, the observation of four engineering courses was done based on an observation checklist adapted from Basturkmen's protocol (1998) (see Appendix 3). The observation protocol included four main parts: background information, importance of English skills, self-evaluation of English abilities, and evaluation of English instruction in the college. The observation

protocol and checklist were initially piloted with a similar class and its complexity and scope discussed with an expert. The observation protocol was geared toward identifying the genres, skills, and sub-skills, and tasks the engineering undergraduate students typically do during their mainstream university education.

Interview

Concerning the perspective of the engineering professors, the interviewees included four professors from the different departments of GCOE. All were full-time faculty members who had been with the institution for three years or more.

Questionnaires

The questionnaire in the interview was adopted from the study of Atai and Shoja (2011). This instrument (see Appendix 2) was used to elicit pertinent information regarding the "target situation needs and present needs" (p. 307) of the respondents as well as their perceived "academic language abilities and the demands of the target academic language use" (p.308). It was felt necessary to adopt this instrument instead of devising a new questionnaire which would have involved conducting a focus group discussion in order to be assured of a validated instrument and to exactly elicit the information needed without the unnecessary details. Similarly, just as in the study of Atai and Shoja (2011), the questionnaire enriched the data gathered from the interview despite some duplicated issues that surfaced in both methods. This repetition of information was taken as a further re-confirmation of the concerns that should be addressed and/or highlighted in the light of English language courses in an ESL culture.

### Obtaining informed consent

As all the respondents are from De La Salle University, it is imperative to follow the university's Research Ethics Office (REO) guidance and resources by completing the checklist (see Appendix 4) that adheres to the Code *of Research Ethics and Guide to Responsible Conduct of Research*. In terms of data retention, the participants in the observation, survey, and interview were assured that the data will be kept only until the publication of the paper. In terms of anonymity, the participants, except for Dr. Lawrence Belo who gave his audio-recorded consent to be named in the paper, were kept anonymous. The audio-recorded consent is a part of REO's *Procedure for Informed Consent.* The participants are all young adults, 18-19 years of age, which means that parental consent was not needed. The participants were assured that there would be no threat to their welfare while and upon obtaining the data for the study.

## Results and Discussion

This section presents the concepts and data that resulted from the interview, survey, and observation. A comparison between the data from the triangulation was also done to present the discrepancies and similarities in the perceptions of the students, professors, and administrators.

### Interview

In the interview with the Chair of the Electronics and Communication (ECE) Department he stated that listening comprehension was the most important skill for engineering students. For the students, however, speaking ranked as most important but this was closely followed by listening comprehension. In terms of reading tasks, professors said that reading comprehension of technical articles was very important as well as reading texts on the computer which has become more common than reading articles on paper. However, professors did not discount writing skills as they felt writing tasks such as lab reports, assignments, projects, and notes were all equally important. Students also believed, just as the Chair of ESE did, that listening, as exhibited in being able to listen and discern class discussions or instructions was very important.

Given that professors are powerful in promoting the students to the next level, the students were asked what they think of their reading skills and see if it agreed with the opinions of the professors. Most of them claimed their level to be 'good' which is perceived to be a notch higher than their perception of their speaking skills. They also believed that their General Vocabulary is good enough for them to get by, but again emphasized that they need to work on their speaking skills, particularly class presentations. This supports the study of Linvill et al. (2019) who claimed that Science, Technology, Engineering, and Mathematics (STEM) students are not as enthusiastic when it comes to communication, but claimed that there was hope as this was slowly changing among STEM professionals. Of course, it was hoped that a more positive take on communication should occur in order to increase "a sense of engineering identity following their experience in a communication course" (Linvill et al., 2019, p. 314). As such, STEM students are now expected to perform better holistically even if communication courses are the least popular of preferences.

### Survey Questionnaire

The results were determined by calculating the mean of each skill. In this manner, the most significant skills among the list of reading, writing, listening, and speaking were identified. Thereafter, the rank was identified based on the mean given for each item on the table. Rank 1 indicates that the skill was considered the most significant.

| English language experience before college | N | Percentage |
|---|---|---|
| Studied English as a subject at school | 21 | 70% |
| Attended an English middle school | 8 | 27% |
| Lived abroad where English is not the medium of instruction | 2 | 2.5% |

Table 1: English language experience of students before college

Table 1 shows the English language experience of students prior to their tertiary education and it was thought that this would be a good place to start to give context to the results of the surveys. Apparently, most of the respondents learned English as a subject at school. This supports their perception that they needed skills in speaking and their perceptions that they fared average in terms of reading and vocabulary. Their exposure, being limited to the school setting, must have influenced their opinion of their ability to use the language in different social contexts. This argument was supported by the data in Table 2. In the meantime, delving into the self-evaluation of their English abilities showed that the students believed that their listening and reading abilities were good. However, they ranked their knowledge of grammar, general vocabulary, and technical vocabulary as unsatisfactory or substandard with the mean of 1.7, 1.9, and 2.0 respectively. The quantitative data possibly shows their perception that they could understand English, but they suffered when there was a need to exhibit this ability. Linvil et al. (2019) believed that STEM students should be trained in "effective communication with multiple audiences" (p. 309) to hone their oral and visual communication. This means that students should have more exposure to the language apart from what they get in the classroom, which according to the survey, is mostly what they received prior to their tertiary education.

| Skill | Mean | Standard Deviation | Rank |
|---|---|---|---|
| Speaking | 2 | 1.15 | 1 |
| Listening Comprehension | 2.42 | 1.03 | 2 |
| Writing | 2.75 | 1.07 | 3 |
| Reading Comprehension | 2.82 | 1.09 | 4 |

Table 2: English skills perceived to be needed by the students

It is not surprising to see that students viewed speaking as important. This is supported by the study of Darling and Dannels (2003) who claimed that practicing eengineers also deem speaking skills as important. Similarly, Adnan's (2019) survey on postgraduate engineering students also revealed that they perceived speaking as an urgently needed language skill. A study by Lippe (2005, as cited in Kakepoto et al., 2012) showed that surveyed college engineering graduates also gave an important role to the speaking skill when reflecting on success in the workplace. It cannot be denied that the Philippines gives premiums to people who can speak English. However, the authors feel that it is distressing that such high esteem is placed on being able to speak English "fluently" despite the lack preparation given to that skill. On the other hand, speaking is understood to be important (Poedjiastutie & Rifah, 2019), but not as important as writing, as a result of the interview with the Chair and the professors of GCOE. However, writing was ranked lowest in the perception of the students.

The Chair and the professors of GCOE were asked to rank the activities they believe could improve their macro skills. The results of the ranking are presented in Tables 3-5, starting with reading.

| Reading | Mean | Standard Deviation | Rank |
|---|---|---|---|
| Reading lab instructions | 1.4 | 0.63 | 1 |
| Reading instructions for assignments/projects | 1.5 | 0.63 | 2 |
| Reading study notes | 1.7 | 0.78 | 3 |
| Reading textbooks | 1.7 | 0.75 | 3 |
| Reading texts on the computer | 1.7 | 0.81 | 3 |
| Reading manuals | 1.8 | 0.64 | 4 |
| Reading technical articles in journals | 1.8 | 0.71 | 4 |
| Reading course handouts | 1.9 | 0.73 | 5 |

Table 3: Importance of reading activities as perceived by the students

Table 3 gives an interesting insight, that both the teachers and students ranked reading lab instructions and reading instructions for assignments as the first two activities that students should be exposed to or should be exposed to more since they are important not only in their tertiary education, but also upon graduation. The study seems to show that the ranking on reading is somewhat less perceptible as opposed to reading in general. One cannot clearly differentiate one reading activity from another since engineering students have to possess adequate reading proficiency to understand all instructions, whether in assignments or lab manuals. This is the same take of Nalliveettil (2014) who claimed that even exams "have to be written in the English language and students have to read and understand the questions which again require reading skills" (p. 39). University instruction should not teach this macro skill separately and thus, should take the engineering course as a reading-oriented course where "students have to understand content and concepts for success in academics" (Nalliveettil, 2014, p. 39). Thus, it does not seem feasible to just focus on one skill at a time when it comes to English language teaching.

| Writing | Mean | Standard Deviation | Rank |
|---|---|---|---|
| Writing lab reports | 1.6 | 0.67 | 1 |
| Writing projects (short) | 1.7 | 0.74 | 2 |
| Answering textbook questions | 1.7 | 0.75 | 2 |
| Writing field-trip reports | 1.7 | 0.77 | 3 |
| Writing notes in lectures | 1.8 | 0.76 | 4 |
| Writing assignments | 1.8 | 0.80 | 4 |

Table 4: Importance of writing activities as perceived by the students

The results in Table 4, in part, support the results shown in Table 3. It is not surprising that among the writing tasks, lab reports received the topmost priority. If the respondents believed that being able to understand lab instructions was important, then being able to write it well should follow suit. The least important task for the respondents was writing assignments and writing notes in lectures. Interestingly, this task is also downplayed not in in engineering but in other areas of studies as has been shown in some studies with similar results (Goldsmith & Willey, 2016). Writing technical reports has been a reported frustration among employers (Ibrahim et al., 2017). Similarly, writing should also be honed holistically where "writer-centred, genre-centred and reader-centred approaches [are] regarded as necessary in helping students to get the most out of their writing, for themselves and their readers, and of motivating students to improve their writing during the four years of their degree course and beyond" (Robinson & Blair, 1995, p. 99). This holistic approach to writing has been often shown to greatly improve this particular macro skill.

The writing activities that were ranked were done to reflect the writing events performed by engineering students. As proficiency in writing is one of the conditions of most foreign companies, it is important to prepare students for full integration into international companies. The last core skills, listening and speaking, were merged, and shown in Table 5, they are both the most important skills used inside the classroom. Adnan (2019) also claimed that listening and speaking were the "most logical instructional starting points when learners have low literacy points" (p. 4). Thus, both macro skills were considered equal in weight for beginners and were logically appropriate to be combined in the survey.

| Listening and Speaking | Mean | Standard Deviation | Rank |
|---|---|---|---|
| Participating in discussions | 1.4 | 0.62 | 1 |
| Listening to spoken presentations | 1.6 | 0.68 | 2 |
| Giving spoken presentations | 1.6 | 0.72 | 2 |
| Following lectures | 1.6 | 0.73 | 2 |
| Listening to instructions | 1.6 | 0.77 | 2 |
| Asking questions in class | 1.7 | 0.65 | 3 |
| Listening to instructions for assignments | 1.7 | 0.70 | 3 |
| Following question/answer sessions in class | 1.7 | 0.75 | 3 |

Table 5: Importance of listening and speaking activities as perceived by the students

Table 5 shows that among the listening tasks presented, listening to instructions was very important while asking questions in class or following questions/answer sessions in class were unimportant. It is very easy to simply report what came out from the survey, however, there are small discrepancies which may be interesting for further studies. One of which is the least important activities perceived for speaking and listening. As previously discussed, engineers find themselves weakest in oral presentations. There is a popular belief in the Philippines that courses that require a lot of speaking are for females and technical skills are for males. The psychology of not 'wanting' or 'needing' to speak for technical students is a

conversation for another day, but it cannot be denied that this perception is clearly reflected in their ranking. They still think that there is no need for too much oral discussions in class, which could have led them to ranking classroom interaction lowest.

Exploring the results of the ranking for listening and speaking also reveals an interesting idea for further research. The first two items on the top of the list deal with an interactive kind of speaking and listening where students "have the chance to listen and ask for clarification or repeating the information said" (Adnan, 2019, p. 4) through authentic dialogues in the classroom. Question/answer sessions in class were ranked lowest and this did not come as a surprise since this issue has long been a problem since it was raised in the study of Ferris and Tagg (1996) where they claimed that professors find it problematic that "some ESL students would be better than others at lecture comprehension, and that students' speaking skills, including both formal presentation skills and class participation, would be of concern to their content-area professors" (p. 300). Consequently, this is one area that needs to be focused on by academicians.

An interesting study by Kim (2006) reveals that "students have focused heavily on writing, without paying much attention to speaking" (p. 479). This could have affected the way students believe in their oral skills. If the US higher education had shifted to a more interactive kind of discussion in the classroom to hone both speaking and listening, then, according to Kim (2006), there might also be a need "to direct efforts toward conducting more research on academic oral communication skills, to meet the academic listening and speaking needs of ESL students in regular university classrooms" (p. 479). Giving spoken presentations, for example, is not as important for them since this type of activity may be passive and does not require them to actively process the information.

The most interesting section of the survey happens to be about their judgment of English language instruction in their college as shown in Table 6.

| Statement | Mean | Standard deviation | Rank |
|---|---|---|---|
| My engineering teachers should practice the correct use of English. | 1.6 | 0.68 | 1 |
| Speaking and writing good English is important in this college. | 1.6 | 0.81 | 2 |
| Some instruction should focus on the English needs of engineers after college. | 1.7 | 0.65 | 3 |
| My English course helps me in my engineering studies. | 1.7 | 0.74 | 4 |
| More should be done to help students with using conversational English. | 1.8 | 0.79 | 5 |
| More time should be given to English instruction. | 1.9 | 0.64 | 6 |

Table 6: Status of English language instruction as perceived by the students

As shown in Table 6 speaking and writing good English is important in GCOE with a mean of 1.6 and ranking second. The first in the rank is also an important angle that should be discussed. Apparently, the engineering students perceived speaking and writing to be important and they expected their teachers to be 'good' in said skills. However, being good in the correct use of English poses several issues. First, it gives an impression that a lecture-type of learning is still in place which is not progressive. According to Thurlings and van Diggelen (2021), engineering universities and educational programmes should discard a teacher-centered approach which means that the practical knowledge of the teachers should be the focus. Second, studies might want to break down the skills that this correct English usage depends on.

### Observation

The results of the observation were supposed to strengthen what was garnered from the survey and the interview yet, the opposite seems to have occurred. The survey showed how students judged good English language instruction from their teacher's ability to use it correctly through a consistent use of the language during a lecture. However, based on the observations, English was used mainly in instructional activities inside the classroom. When eliciting a response students replied in *Taglish*[4] or Filipino and the professors did not seem to mind. In addition, Tagalog was also predominantly used in conversing with one another; the synchronous sessions observed, and the ones recorded were during topic selections for an output. Apart from that, among students or peers, Filipino or *Taglish* was used to raise a query or ask for clarification/repetition, or ask questions about the topic.

In order to shed light on this trend, a personal interview with Dr. Lawrence Belo from the Chemical Engineering Department revealed that speaking in *Taglish* is expected for there are technical concepts in

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[4] Their native language Tagalog or Filipino. *Taglish* is a mixture of Tagalog + English.

engineering that can only be adequately expressed in the native tongue or to be specific, Tagalog or *Taglish*. He added that engineering students were also direct to the point and did not enjoy elaborating so they would rather use the language they were most comfortable with. This revelation needs expansion for it did not seem to satisfy the goal, which was to improve their English skills, particularly in speaking – a skill needed in the workplace, especially in the ASEAN integration. A follow-up interview revealed that engineering graduates at DLSU have a good command of at least Basic English. It should not be denied that the bottom line is a slight modification in the interactive sessions to improve their language skills as supported in the survey results of Clement and Murugavel (2015) which suggested that there was "evidence of the gap between the English professors' methodology and engineering students' confidence levels and also accentuate the importance of suitable training programs for required for engineering students" (p. 116). As stated previously, there is a need to enhance interactions and active participation that involves both speaking and listening inside the classroom.

## Summary, Conclusions, and Recommendations

It is apparent that the results of the study call for a change in the curriculum, including the mode of delivery where *Taglish* should be limited to meet the demands of the industry. The survey suggested that their exposure to the language was not adequate prior to their tertiary studies and thus, consistent interventions outside of the classroom walls should be strengthened. Apart from the general concepts that this study revealed, specific ones should also be highlighted, starting with the tasks uncovered to be important for engineering students. In reading, these are being able to effectively read lab and homework instructions; in writing, being able to write lab reports and answer textbook questions. In listening and in speaking, students believed that being able to listen and participate in class discussions was important.

Students had yet to master the skill attributes commonly required in the classroom as indicated by their self-reports of their actual verbal, reading, and writing skills. These scenarios imply that the present ESP syllabus needs to be revised to develop the language skills where the existing learning gaps are addressed during classroom tasks. It was also implied that they prefer to learn English as used in their job-relevant tasks.

It is urgently necessary to review the content and delivery of the ESP curricula given the students acknowledged a gap between their actual and needed skills in the workplace. The present curriculum focuses on the general basic skills required by students to be more competent in class and it is common to all the engineering disciplines taught in the De la Salle education system. It is proposed to modify the design of the ESP syllabus to accommodate the various engineering disciplines. This will help engineering students become more aware of their workplace language needs. Ideally, an ESP syllabus should also give more focus on job-related tasks at the workplace with an emphasis on removing the major inconvenience of time constraints, thus, more semesters should be allotted to the teaching of language to engineering students. Furthermore, the DLSU education system must respond to the needs of the workplace by producing competent graduates. As a result, the design of the curriculum, including the content of the syllabi, the method of delivery, and the assessment of methods, should be industry-based.

In terms of perception, students learned more when a more practical approach was adopted. Though they believed that teachers should possess a decent level of language skills, they also believed that a more personalized approach would help them in their struggle to use the language. This implies that lecture-based learning is not a preferred instructional method. There seems to be an assumption that teachers should be efficient in conducting language activities without necessarily being traditional in approach. Thus, the professional practice where techniques respect the curriculum while balancing a manageable workload would be beneficial in the engineering classroom for language learning.

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# Appendix 1

## Engineering Students Of De La Salle University Manila

**I. Background Information**

*First of all, please provide some information about yourself. Please tick (X) the appropriate space(s).*

**1. Sex**                                                _____ male                                                          _____ female

**2. Department in the College:**

__electrical        __computer        __chemical        __industrial        __mechanical    __biomedical        __civil

**3. English language experience *before* college**

__ I studied English as a subject at school.

__ I attended an English-medium school.

__ I lived abroad.

__ Others (please specify) _____

**4. Present English courses**            _____ ENGLCOM            _____ENGLRES            _____SPEECOM

**5. If your present English course is ENGLRES or SPEECOM, please answer this question. *If not, leave it blank.***

Did you take the ENGLCOM course in College?                    ___ Yes, Number of times: ___ 1 ___ 2 ___ No

**6. Is your native tongue Filipino?**            _____ Yes                  _____ No

**7. When do you use English?**

___ When studying                                ___ When socializing

___ At home                                          ___ Others (please specify)

**II. Language Needs in the College**

*Now for some information about using English for your studies.*

**1.** Of the four major English skills, which are the most important for success in your other subjects in the College? Number choices 1–4, with 1 as the most important

___ Reading comprehension

___ Listening comprehension

___ Speaking

___ Writing

**2.** How important are these tasks in English for your other subjects? Circle the appropriate number according to the following scale.

**1 = very important 2 = important 3 = not important**

| Reading Tasks | Rating | Writing Tasks | Rating |
|---|---|---|---|
| Reading  textbooks | **1 2 3** | Writing lab reports | **1 2 3** |
| Reading technical articles in journals | **1 2 3** | Writing assignments | **1 2 3** |
| Reading manuals | **1 2 3** | Writing field-trip reports | **1 2 3** |
| Reading course handouts | **1 2 3** | Writing projects (short) | **1 2 3** |
| Reading texts on the computer | **1 2 3** | Writing notes in lectures | **1 2 3** |
| Reading instructions for assignments/projects | **1 2 3** | Answering textbook questions | **1 2 3** |
| Reading lab instructions | **1 2 3** | | |
| Reading study notes | **1 2 3** | | |
| **Listening and Speaking Tasks** | **Rating** | **Listening and Speaking Tasks** | **Rating** |
| following lectures | **1 2 3** | listening to instructions | **1 2 3** |
| following question/answer sessions in class | **1 2 3** | listening to instructions for assignments | **1 2 3** |
| listening to spoken presentations | **1 2 3** | asking questions in class | **1 2 3** |
| participating in discussions | **1 2 3** | giving spoken presentations | **1 2 3** |

**3.** In relation to your college studies, evaluate your abilities and knowledge of English in the following areas.

**1 = good 2 = satisfactory 3 = unsatisfactory**

| English Language Ability | Rating |
|---|---|
| Reading | **1 2 3** |
| Writing | **1 2 3** |
| Speaking | **1 2 3** |
| Listening | **1 2 3** |
| Grammar | **1 2 3** |
| General Vocabulary | **1 2 3** |
| Technical Vocabulary | **1 2 3** |

### III. English Language Instruction

*And next, provide your opinions about English language instruction in the College of Engineering. Here are some ideas about English language in the College. Please indicate how far you agree with each idea.*

**1 = strongly agree 2 = agree 3 = disagree**

| | |
|---|---|
| More time should be given to English instruction. | **1 2 3** |
| More should be done to help students with using conversational English. | **1 2 3** |
| Speaking and writing good English is important in this college. | **1 2 3** |
| Some instruction should focus on the English needs of engineers after college. | **1 2 3** |
| My Engineering teachers practice the correct use of English. | **1 2 3** |
| My English course helps me in my engineering studies. | **1 2 3** |

***And finally, do you have any further comments about English language instruction in this College?***

# Appendix 2

# Interview Questionnaire

**I. Background Information**

*First of all, please provide some information about yourself.*

**1. Sex**                                        _____ male _____ female

**2. Department in the College:**

_electrical   _computer   _chemical   _industrial   _ mechanical   _ biomedical    __ civil

**II. Language Needs in the College**

*Now for some information about using English in Engineering*

**1. Of the four major English skills, which are the most important for success in other subjects in the College?** Number choices 1–4, with 1 as the most important

___ Reading comprehension

___ Listening comprehension

___ Speaking

___ Writing

**2. How important are these tasks in English for the students' other subjects? Circle the appropriate number according to the following scale.**

**1 = very important 2 = important 3 = not important**

| READING | | WRITING | |
|---|---|---|---|
| Reading  textbooks | **1 2 3** | Writing lab reports | **1 2 3** |
| Reading technical articles in journals | **1 2 3** | Writing assignments | **1 2 3** |
| Reading manuals | **1 2 3** | Writing field-trip reports | **1 2 3** |
| Reading course handouts | **1 2 3** | Writing projects (short) | **1 2 3** |
| Reading texts on the computer | **1 2 3** | Writing notes in lectures | **1 2 3** |
| Reading instructions for assignments/projects | **1 2 3** | Writing answering questions related to part of the textbook | **1 2 3** |
| Reading lab instructions | **1 2 3** | | |
| Reading study notes | **1 2 3** | | |
| **Listening and Speaking** | | | |
| following lectures | **1 2 3** | listening to instructions | **1 2 3** |
| following question/answer sessions in class | **1 2 3** | listening to instructions for assignments | **1 2 3** |
| listening to spoken presentations | **1 2 3** | asking questions in class | **1 2 3** |
| participating in discussions | **1 2 3** | giving spoken presentations | **1 2 3** |
| **OTHER TASKS** | | | |
| Reading Exam Questions | **1 2 3** | Answering Exam Questions | **1 2 3** |

**3. In relation to your students' subjects, evaluate their abilities and knowledge of English in the following areas.**

**1 = good 2 = satisfactory 3 = unsatisfactory**

| | |
|---|---|
| *Reading* | **1 2 3** |
| *Writing* | **1 2 3** |
| *Speaking* | **1 2 3** |
| *Listening* | **1 2 3** |
| *Grammar* | **1 2 3** |
| *General Vocabulary* | **1 2 3** |
| *Technical Vocabulary* | **1 2 3** |

**III. English Language Instruction**

*And next, provide your opinions about English language instruction in the College of Engineering. Here are some ideas about English language in the College. Please indicate how far you agree with each idea.*

**1 = strongly agree 2 = agree 3 = disagree**

| | |
|---|---|
| More time should be given to English instruction. | **1 2 3** |
| More should be done to help students with using conversational English. | **1 2 3** |
| Speaking and writing good English is important in this college. | **1 2 3** |
| Some instruction should focus on the English needs of engineers after college. **1 2 3** | |
| Engineering teachers model the correct use of English. | **1 2 3** |
| English courses help my students in my engineering studies. | **1 2 3** |

*And finally, do you have any further comments about English language instruction in this College?*

# APPENDIX 3

# Class Observation Protocol

Date:
Time:
Course:
Department:
Class Type:


**I. Instructional Activity**
Note the language (English/**Filipino**) used.
___ Lecturer (monologue)
___ Discussion (student to student)
___ Instructions
___ Instructor questioning students
___ Student questioning students
___ Small group discussion
___ Small group work
___ Presentation
___ Other


**II. Instructional Aids**
Note which of the following were used.
___ Over-heads
___ Handouts
___ Video/film
___ Blackboard text
___ Blackboard diagram/numerical information
___ Tools or other realia
___ Other


**III. Student Activity**
Note some samples of the language used, if relevant.
___ Taking notes
___ Asking questions
___ Asking for clarification/repetition
___ Explaining (e.g., instructions)
___ Giving comments
___ Other


**IV. Student Difficulties**
Note any observations you had of the nature, extent, and source of any language-related difficulties experienced by students.


**V. Other**
Do you have any other useful information about your observation or this protocol?

# Appendix 4

| De La Salle University |
|---|

**General Research Ethics Checklist**

*This checklist is to ensure that the research conducted by the faculty members and students of De La Salle University is carried out according to the guiding principles outlined in the Code of Research Ethics of the University. The investigator is advised to refer to the De La Salle University Code of Research Ethics and Guide to Responsible Conduct of Research before completing this checklist. Statements pertinent to ethical issues in research should be addressed below. The checklist will help the researcher/s and advisers/readers/evaluators determine whether procedures should be undertaken during the course of the research to maintain ethical standards. The University's Guide to the Responsible Conduct of Research provides details on these appropriate procedures.*

| Faculty/ASF Researcher Details | |
|---|---|
| Principal Investigator | |
| Department | |
| Proposed Title of the Research | |
| Term(s) and academic year in which research is to be conducted | |
| Other researchers involved in project including their positions (e.g., student, faculty) | |

| Student Researcher Details (for students who are co-proponents) | |
|---|---|
| Course Title | |
| Department | |
| Thesis Adviser | |
| Email Address | |

| *This checklist must be completed AFTER the* De La Salle University Code of Ethics *has been read and BEFORE gathering data.* | | |
|---|---|---|

| Questions | Yes | No |
|---|---|---|
| 1. Does your research involve human participants (this includes new data gathered or using pre-existing data)? If your answer is **yes**, please answer **Checklist A (Human Participants).** | | |
| 2. Does your research involve animals (non-human subjects)? If your answer is **yes**, please answer **Checklist B (Animal Subjects).** | | |
| 3. Does your research involve Wildlife? If your answer is **yes**, please answer **Checklist C (Wildlife)**. | | |
| 4. Does your research involve microorganisms that are infectious, disease causing or harmful to health? If your answer is **yes**, please answer **Checklist D (Infectious Agents).** | | |
| 5. Does your research involve toxic/chemicals/ substances/materials? If your answer is **yes**, please answer **Checklist E (Toxic Agents).** | | |

**Research with Ethical Issues to address:**

If you have a YES answer to any of the above categories, you will be required to complete a detailed checklist for that particular category. A YES answer does not mean the disapproval of your research proposal. By providing you with a more detailed checklist, we ensure that the ethical concerns are identified so these can be addressed in adherence to the University Code of Ethics.