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English and Communication Skills for the Global Engineer

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Engineering graduates require an ever-increasing range of skills to maintain relevance with the global environment of the new millennium. Communication skills are an vital component of this, recognised by academia and industry alike. English language skills are also important given its widespread status across the globe as a *lingua franca*. Indeed, multilingual skills are considered a salient element in the make-up of the new global engineer. English for specific purposes focuses the learner's attention on the particular terminology and communication skills required in the international professional field. Communication skills development is discussed in the paper, with examples given of different methods of teaching and assessment. The impacts on communication skills development include various elements, including gender equality. A lack of sufficient communication skills serves only to undermine the image of the engineer, but this can be tackled by engaging features of emotional intelligence (EQ) in the education of engineers. EQ offers various components that can improve communication skills and emphasise a more experiential approach to learning.

INTRODUCTION

Communication skills are essential for an engineer who aspires to carry out his/her professional practice in the global arena. Engineering communication skills basically constitute several core elements such as the fluency in the English language and the fundamentals of visual communication.

Evidence indicates that communication skills are what helped *Homo sapiens* evolve beyond our related ancestors, and that these skills have helped humankind develop into the advanced societies on Earth today [1]. However, these skills have become stifled in the very discipline that has brought so many advancements, and that is engineering.

There is ample evidence that graduate engineers lack the required standard of communication skills, particularly when compared to the needs of industry internationally [2][3]. This can also be determined when considering related disciplines offered at universities (eg business). This is so much so that the Dean of Engineering at Duke University stated that *…engineers who are adept at communications have a considerable advantage over those who are not* [4]. Furthermore, this lack of communication skills only serves to undermine the whole profile of the professional engineer.

THE GLOBAL ENGINEER

Globalisation directly influences industry's needs; a global engineer must be able to easily cross national and cultural boundaries. This in turn directly affects engineering education. A common code for communication is required. Those education institutions, which meet the language requirements for the new global engineer, will be ready to face the new millennium. H.P. Jensen states that employers want:

> *…a number of new competencies, with an emphasis on an increased ability to communicate…and good foreign language skills* [2].

This is reinforced in N. Grünwald's study of competencies required by the *engineer of tomorrow*, which includes hard skills like good foreign language skills. He goes further to claim that cross-disciplinary language skills are not sufficiently taught [3]. This indicates a lack of a direct fit between graduate skills and those required by industry.

Engineers can relate the same theories of mathematics, of mechanics and technology, but the modern engineer must also be able to communicate effectively in a shared tongue. This is especially important given that engineering projects are now planned and implemented across national and cultural borders.

ENGLISH AND ENGINEERING

English has become the ascendant language internationally, being the most widespread. This will influence the language of communication between professionals internationally. In this age of globalisation, the number of international projects is increasing, and cross-cultural communication and collaboration is on the rise; this is particularly so for the now international practice of engineering.

The Globalisation of English

English has been widely accepted as *the most widespread language in the world* [5]. It is the first language for many countries around the planet: from the United Kingdom and Ireland to the USA, from Canada to Australia and New Zealand, from Guyana to Jamaica, plus others. As a second language, it is also very widespread. For instance, now after the fall of communism, it has become the second language in countries in Central and Eastern Europe, and English is taught as part of multilingual education in India, South Africa, Singapore and others.

The distinction here lies between the *most widespread* versus the *most widely spoken*. However, the number of people who speak English with at least some degree of proficiency exceeds any other language, and its phenomenal advance around this planet is unparalleled in the history of language [6]. This is particularly important for the engineering student, as this indicates that English will be of more use internationally than virtually any other language due to its spread.

English is cited as the *…major language of international business, diplomacy, and science and the professions* [5]. It is through this method that English appears to be spreading the most, compared to past centuries that were dominated by immigration and settlement, such as Canada, the USA and Australia.

English is the prime means for communication, and can often serve as the *global language* between two people from two different cultures, wherein English is not the native tongue. For example, French engineers communicated with Egyptian engineers in English during the recent building of the Cairo subway [7]. Also, a collaboration at Airbus industries between English, French, German and Spanish companies utilised English as the communication medium between workers. An unusual example comes from the Swedish transport manufacturer Volvo, which has made English the language for managers at its new plant in South Korea, with English lessons being taken by some employees during production breaks.

Some multinational firms with bases in continental Europe use English as the prime form of communication in the office. In this sense, multinational corporations can be seen to indirectly influence the educational policies in foreign lands by their value creation of particular languages through global economic power. This also delivers a strategic advantage to those institutions in non-English countries with effective English language instruction.

English Language Instruction

Integrating relevant technical jargon and documentation in foreign language tuition courses in engineering is essential. The cultural history of prime English-speaking nations, as well as the history of major engineering feats, can be used in the instruction of engineering students to maintain relevance.

There are quite a few institutions in non-English speaking nations that offer in engineering courses in English, or at least subjects in English. These include the Technical University of Denmark, the Technical University of Lodz in Poland, the Technical University of Budapest in Hungary, several German universities, plus other academic institutions in Europe, Asia, and other regions. These institutions are meeting the demands of industry internationally by contributing to the educational needs of the global engineer.

University level education in emerging economies is set to see an increase in English-medium distance learning programmes that are supplied by western countries. This includes online education links being recently sought by Malaysia and Singapore. This is despite rumblings about the cultural impact of English on these two cultures.

In a study on the future of the English language, Graddol found that English, Spanish and Mandarin would continue to rise as the dominant language blocs. This may well lead to an increasing level of language regionalisation where geographical areas become dominated by one language [8].

English for Specific Purposes

There is a clear necessity for effective English communication skills for engineers in the current globalised

environment. A course in English for Specific Purposes (ESP) will enhance English language training and an engineering student's communication skills. It will also aid in the globalisation of education and the internationalisation of practicing engineers.

The English language has become a major medium for communication across borders globally; a deficiency in this area may result in barriers for graduates' personal and professional development. One prime example may be found at the Tomsk Polytechnic University (TPU), in Tomsk, Russia, which has designed a course for engineers preliminarily titled *English for Specific Purposes (ESP) in Engineering Education.* ESP focuses the learner's attention on the language and communication requirements in a particular professional field. The TPU's ESP course is part of an extended Multilevel Intensive Foreign Language-Training (MILFT) programme, which has been designed for the students and faculty of the TPU [9].

The concept of ESP achieves more in the education of engineering students by focusing the learner's attention on the particular terminology and communication skills required in the professional field. Various examples in the engineering field can be found, including computer science, maritime engineering's *seaspeak*, aviation's *airspeak* and the railway's *railspeak*.

Teaching English to engineers is a delicate and demanding matter in terms of content, methods and techniques, and deciding which are appropriate for this particular area of engineering and English. That is, the aim in such an interdisciplinary course is to develop and master relevant communication and professional skills, using English as a means and a kind of mediator in shaping future engineers.

To achieve this goal, ESP teachers have to plan the course they teach and provide the materials for it. Rarely is it possible to use a particular textbook without the need for supplementary material, and sometimes no really suitable published materials exist for certain learners' needs. The role of ESP teachers thus involves choosing suitable published materials from a variety of reliable and valid sources, adapting materials when published ones are not suitable, and even writing new materials if nothing suitable exists.

THE INTERNET AND MULTILINGUALISM

The Internet has become increasingly a crucible for world languages. This has direct implications on engineering education, as the Internet is central to various elements of engineering education. It also increases the global access to engineering education information, as under-served languages come online.

Statistics indicate that the prime language of Internet sites is becoming increasingly regionalised, with the local dominant language being the first choice in language options (see Figure 1). English is still strong, but it is becoming the second choice in an increasingly multilingual international community. The Internet, as an instrument of globalisation, contributes to this process of recognising diversity.

This has clear implications for engineering education. Language will no longer be the prime determinant for access to engineering education based on traditional European structures because large, previously under-represented communities will gain greater representation. Furthermore, this expanded access to the Internet builds a new dimension in the education process in this era of globalisation: by combining language education with technology education.

This also generates a greater element of regionalisation as these large under-represented groups in Asia and Africa demand the skills required to operate competitively in the world. However, language still remains a strong barrier.

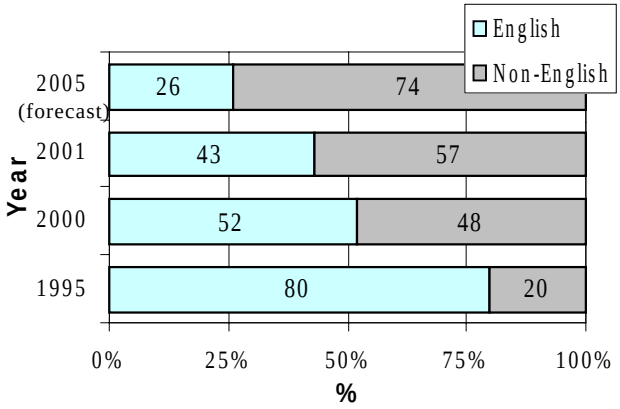

Figure 1: Evolution of the online language population [10].

Global Language

The process of globalisation, powered through technology, initially enabled English to become the global language. Prime growth in Internet usage is coming from China and India, and while there is good English language proficiency in the latter, the preference is generally more for navigating in the user's native tongue. The Internet seems to be the new millennium's *Tower of Babel*, with increasingly more languages concentrated in the one type of technology.

In this new millennium, people who speak English alongside other languages will outnumber those who speak it as a first language [8]. There is also expected to be a language shift from those who speak English as foreign language (where there is no *local* model for English) to those who speak English as a *second*

language. This will occur as English begins to penetrate new domains, such as China, where it does not already exist as part of the speaker's community. This has clear implications for education regarding decisions on the language of instruction, language training as well as Internet courses.

This monolingual dominance of English instruction in some nations is brought into question at a time when employers are demanding new competencies, including communication and foreign language skills, and not just from engineering candidates in European nations.

Although the focus will be decreasing on the English language, it will still maintain strong relevance as a *secondary language* for many people around the world. To this extent, English will be the linguistic bridge in international engineering projects.

The importance of multilingualism for the global engineer is not confined to learning English. Multilingualism in an engineering course is increasingly focusing on regional communication skills, where the main languages from within that country's region are becoming just as important as learning English.

European students, when recently surveyed, stated that they felt working in a foreign language was a necessary activity in an international career. The implications of this are apparent; the English language maintains extremely strong relevance now and in the future, particularly in acting as a connection for communication between two cultures. The English language's strengths will lie not in acting as a *first language*, but as a *secondary* language in international multilingual education.

This also has clear implications for engineering education. As the profession of engineering becomes increasingly international, English language skills become very important to facilitate communication between cultures, emphasising the necessity for English language and communication skills in engineering curricula.

COMMUNICATION SKILLS

A recent report from Melbourne, Australia, stated that employers now seek graduates with skills beyond the standard paper degree; this includes an excellent level of skills in:

- Communication
- Decision-making
- Teamwork

Other areas identified in the report included competencies in business acumen, marketing and public relations. Having the most knowledge was not as important as getting the work done in the most effective manner. Employers gave considerable value on graduates acquiring a diverse set of skills in differing work environments [11].

However, the report also found that most graduates felt that they had gained analytical and problem-solving skills, subject-specific knowledge, research and improved decision-making abilities through their degrees. Yet despite this, much fewer felt that their graduate degree provided:

- Oral communication skills.
- Awareness of the social implications of their discipline's developments.
- Management skills.
- Understanding of other points of view and other cultures.
- Confidence and competence to work in international environments [11].

Notably, oral communication skills were considered very important in the graduates' new work environments, but this was in the face of the low level of oral communication skills imparted during their studies. However, neglecting learning opportunities can engender a shallow level of understanding in the graduate if he/she does not see the broader picture.

The burgeoning importance placed on oral communication skills by employers has been echoed internationally for a decade or more and across disciplines. Knowledge and technical know-how are clearly important, but these must be presented with an excellent standard of communication skills, particularly oral. Indeed, oral communication and presentation skills are considered one of the best *career enhancers* and to be the *single biggest factor in determining a student's career success or failure* [12].

Their relevance was emphasised recently with the statement that:

> *Skills such as problem solving, communications, interpersonal skills and critical and independent thinking should be fostered in engineering education, not just because they are qualities that employers look for but because they should be part of any tertiary education* [13].

COMMUNICATION SKILLS DEVELOPMENT

A review of literature indicates that oral communication has been identified as a *learnable skill* [12]. Furthermore, communication skills development has been demonstrated through the use of various methods, such as class discussions and others.

While the study of famous speeches, learning oral communication theories and techniques from textbooks will still be beneficial, it should be noted that the literature has indicated that experiential methods have generally yielded better results than purely didactic means.

Presentations

The student's knowledge base is augmented by allocating class projects for presentations. However, students will not place any great emphasis on presentation, and with it oral communication skills, if presentation and communication is not allocated a significant share for the exercise's marks. Furthermore, as much as many students dislike giving presentations, it is better that they experience a *dry run* in their education than to be suddenly confronted in the workplace. It should be noted that a recent Irish study found that 78% of a sample of practicing engineering graduates stated that were required to give oral presentations as part of their work, and quite often this was on a regular basis [14].

Group projects and presentations encourage and enhance the interpersonal skills of the student members and should be emphasised early in the education curricula. This should be considered in particular as teamwork is recognised as a core skill in industry, and communication with team members needs to be effective.

Peer Review

Peer assessment has been shown to provide many advantages and disadvantages. Advantages include getting students to think about the exercise more deeply, recognise others' viewpoints and how to give constructive criticism to peers. Disadvantages include potential bias, reluctance to give low marks for poor work from their peers and the need for clearer guidelines.

However, such disadvantages can be countered by utilising group-based marking, rather than individual, increasing marking guideline specificity, and limiting the impact of the peer review exercise with regard to the overall unit grade.

Role-play

As knowledge of communication theory does not necessarily parallel skills in practice, it is important to immerse students in similar work environments. Context-specific enactments, or role-play, can focus the student's attention on the differing types of communication required with various groups in potential future work situations. By engaging the students directly in active learning, they learn *by doing*.

It is important to utilise pseudo environments to simulate meetings with clients/developers/peers/etc, as this will also allow students to interact with different levels of technical intensity, as well as engaging in non-technical communications. Oral communication skills are needed not just for internal company matters, but also when dealing with external issues.

Video

Video/audio grading has been shown to dramatically improve presentation skills in students, with one prime example given where student presentations were filmed and then graded with dubbing from the teacher and a feedback sheet [12]. Importantly, this provides relevant educational feedback to the student so that he/she can actually see and hear the positives and negatives of his/her presentation. Additionally, it is not transitory as the student's performance can be revisited.

Technology

Current technology should be utilised, or at least demonstrated to the students, so that they are aware of what is in use beyond the university walls. The Irish study cited earlier found that instructors in communications need to review and update methods due to the rapid advances in communications technology [14].

Furthermore, this Irish study found that practising engineering graduates suggested that greater content for communication courses in undergraduate engineering cover basic MS Office applications (number 3 on the list, directly after oral presentations and keyboard skills), as well as other technical elements including Web page design, e-mail and graphic design. The MS Office suite includes Word, Excel and PowerPoint, and these were the three prime tools utilised in oral presentations by the graduates in industry [14]. This gives a clear indication of technological elements that need to be incorporated into fundamental communication training for engineering students in preparation for industry.

International Elements

Communication skills training, while focused on the dominant culture of the host university's country, should also be mindful of variations in intercultural communication. With globalisation becoming commonplace also with engineering work, graduates need to have an understanding of international communications. This

includes aspects such as implicit language and cross-cultural idiosyncrasies, or risk being isolated, and is particularly relevant in dealings between native English speakers and non-native English speakers.

Active Involvement of the Learner

Littlewood put forward several elements that, importantly, involve the learner in order to reinforce learning. These four parts are:

- The classroom must be conducive to communication and learning.
- Learning has to be relevant to learners' interests and needs.
- Both processes and products are important in the classroom.
- Learners must engage in active roles in the classroom [15].

Engaging learners will help facilitate and stimulate effective and purposeful learning by the students. Involving the learners directly, in particular, will engender a stronger sense of responsibility in the future graduates that they can take beyond the university and into the work arena. This is especially important in engaging learners of English as a Second Language (ESL) and English for Specific Purposes (ESP) as it involves new vocabulary.

The Fun Factor in Education

There is not much fun but rather a great deal of stress in engineering education. Many students fail to turn up to classes because they ultimately become dissatisfied with the style of the lectures, strongly suggesting that the students fail to see the relevance of attendance and, at times, the relevance of the topic being taught. Many engineering students are not especially motivated to learn certain subjects, primarily because they have no real idea why they may need all this information. They also do not know whether all of the material is actually required for their career.

Team-teaching Collaborations

Team-teaching collaboration between a subject expert and an English language teacher can be employed for the benefit of learners who will make the most of this integration. Overseas experience already indicates that the synergy from team-teaching can significantly improve the written and communication skills of most students, particularly oral presentations and report writing, and that it generated a positive experience for all with a focus on students' needs and interests.

COMMUNICATION SKILLS ASSESSMENT

Communication skills have been identified as multi-dimensional and so it becomes crucial to classify how they will be assessed in the students' work. Furthermore, the particular communication skills required in a profession are usually poorly defined. One study identified that communication skills assessment must:

- Be formal so that it occurs at specific times and contributes to a student's marks.
- Provide feedback to be educational.
- Involve active participation by students in actual communication situations.
- Tackle student insights so that skills are identified and developed [16].

Individual feedback is important for improving the education of students. However, there needs to be prudent identification and clear operational definitions of the rating dimensions so that the same standards are applied to all students: consistency and accuracy. It is vital that the student understands what is expected and what will be assessed ahead of time to facilitate education, learning and the generation of desirable characteristics, thereby delivering formative (feedback) and summative (evaluation) assessment [16]. The oral communication element also needs to fit in well with the subject at hand.

Student self-assessment was utilised in the study at Monash University, allowing for students to display insight into what was expected of them and their own strengths and weaknesses. The assessor would also provide feedback to this self-assessment [16]. This would also give students the opportunity for reflection.

ISSUES IN ENGINEERING EDUCATION

Three sources of weakness that can significantly impact on an engineer's communication skills education were identified as:

- Students' attitudes to communication.
- Insufficient course content.
- Deficient or inappropriate teaching methods [17].

Another significant element included the lack of opportunity for engineering students to be able to practise communication skills, particularly the oral component [17].

Gender Equality

Gender distribution in the engineering profession continues to be dominated by males. This is evidenced

in recent statistics in Australia where male participation stands at 85%, despite a (slowing) increase in female student numbers over the past decades [18].

However, female participation is increasing at a much greater rate when engineering is coupled with another discipline as part of a double degree [17]. The benefits of a double degree is that the student's skills base is augmented in other areas, including communication, as students are introduced to other subjects in tandem with the engineering degree. Further study would need to be undertaken to cover gender participation in double degrees, with the possibility that females may graduate with a greater range skills that would be more in line with industry demands.

Refresher Courses for Educators

The TPU in Russia has instituted a new extended language-learning programme, which targets TPU academics who provide, organise and manage engineering educational programmes taught in English. The interconnected course components cover a wide range of settings to effectively train learners to communicate in English.

The TPU's initiative provides an excellent example of the importance of providing refresher courses for educators, in this case, in English communication skills. Such refresher courses contribute to life-long learning and the updating of skills for educators and, ultimately, students. Furthermore, by focusing on educators, these courses help to minimise any errors or bad habits that may, in turn, have been handed on to students.

Life-long Learning

Tasks involving oral communication skills within the subject framework can contribute to life-long learning by aiding in the development of those skills necessary for life-long learning. Similarly, it was felt that self-assessment of communication tasks would also encourage *future learning* [16].

Integration

Adding social science subjects into the engineering curriculum mix will encourage oral and written communication skills, as well as critical analysis. However, stand-alone subjects need to clearly identify the benefits and relevance of utilising the methods learned so that they can be transferred into the rest of the student's experience. For example, integrating compulsory communications education, whether represented wholly or in part by one or more units, should be part of an engineering degree. However, this is not enough; those skills need to be utilised *across* the degree to demonstrate application and reinforce behaviour.

Engineering exercises need to incorporate oral and written communication skills throughout the curriculum and include presentation and communication as part of the marking process, rather than generate a specific subject that stands in isolation to the rest of the curriculum. Some level of consistency across the degree will serve to reinforce what has been learnt in previous subjects and build on previous knowledge, as already suggested by constructivist theory.

To maintain relevance in today's world, universities need to reflect industry (and social) demands by imparting to graduates the required skills. Isolating into separate subjects those particular skills recognised as necessary, such as oral communication skills, will not facilitate reinforcing the desired behaviour unless they are incorporated into engineering subjects. Integrating these skills within subject modules, especially in the marking structure, can thereby achieve the right skills combination.

Several areas of communication skills required for engineers have been already examined. The first group area of research was English language proficiency. These included the following attributes:

- Spoken language fluency
- Written language fluency
- Regional/national dialects
- Technical terminology
- Professional jargon

IMAGE OF THE ENGINEER

This insufficient level of communication skills instruction in engineering education generally only serves to undermine the whole profile of the professional engineer. This in turn affects recruitment and retention in engineering studies [19]. Indeed, the image of the engineer may be directly associated with the quality of the engineer. Lack of leadership amongst engineers will lead to a low profile. Increased public standing can eventuate through professional activities, as well as the ability to communicate to the general public.

Ineffective communication skills only reinforce negative stereotypes of the engineer. Furthermore, this lack of serviceable communication skills contributes to the low profile of engineering in the general public. However, the lack of standardised and accessible engineering language tools encountered by engineering students in their university courses may well be responsible, at least to some degree, for the level of bad communication skills. A more proactive and

accessible style of communication can be more engaging for the people whom the engineer must deal with.

EMOTIONAL INTELLIGENCE

The theory of emotional intelligence (EQ) states that IQ is actually less important for success in life and work than EQ – a set of skills that are not directly related to academic ability [20].

Communication may be inhibited depending on the level of self-actualisation of the communicator. This ties in with the EQ elements of self-awareness and self-regulation. Given that communication is ranked as one of the prime characteristics required by employers in the engineering industry, EQ has an important role to play in strengthening communication skills when certain EQ elements are enhanced in the student.

EQ and Communication Skills in Engineering

It should be noted that EQ is *not* the opposite of IQ. In industry, *IQ gets you hired, but EQ gets you promoted* [21]. For example, a manager at AT&T Bell Labs was asked to rank his top performing engineers. High IQ was not the deciding factor, but instead how the person performed regarding answering e-mails, how good they were at collaborating and networking with colleagues (rather than lone wolf), and their popularity with others (rather than socially awkward) in order to achieve the cooperation required to attain the goals [21].

This example highlights the benefits of high EQ regarding communication skills, time management, teamwork, leadership skills and business acumen. These important skills flow on from emotional intelligence, such as the skilful recognition of others' emotional reactions and empathy to come across as genuine and warm, which will achieve greater cooperation from others, rather than coming across as oblivious and boorish.

The engineer's stereotypical negative image of the socially inept genius can inhibit student recruitment and retention. This may be countered through graduates employing EQ tactics in the workplace, thereby generating an improved image for engineers through interaction. However, these skills must be educed in the engineering students in the first place.

Incorporating elements of EQ learning in studies, rather than as a separate study unit or module, will link learning and work attitudes, including motivation, creativity and interpersonal skills, with the tasks at hand, such as project work. Learning EQ skills seems to be in line with experiential learning and a constructivist approach to studies, as EQ by nature implies an experiential approach. Encouraging students to learn these new skills through project work activities and in student-centred learning will succeed more than would a stand-alone lecture on EQ; theory without practice does not run very far.

The heavy traditionalism of many courses have the perspective of teaching only *real engineering*, ie defining and isolating problems and achieving technical solutions. Exposure to this culture of traditionalist engineering education not only discourages reflection, but also generates future engineers *who both lack and do not appreciate the value of the skills of reflection* [22]. As such, do engineering studies actively discourage the EQ factor by the very nature of the traditionalist style of teaching in this field? Such traditionalist teaching imparts engineering as a *discipline* rather than as a *career*.

Enhancing communication skills across the curricula, again rather than in a stand-alone subject, will contribute to higher EQ by targeting certain elements. This includes delivery of oral presentations in engineering studies and incorporating communication and presentation skills in the marking structure of reports so that the students treat them more seriously. This may involve a restructuring of certain components of subjects and, indeed, the curriculum.

Experiential approaches, which involve the student in the actual experience of communication, with opportunities for debriefing and re-application, provide opportunities for the development of self-awareness. Videotape playbacks of oral presentations also stimulate reflection in the student. Constructivist approaches build on past learning and should be utilised to build on students' positive learning experiences to enhance learning and skills development.

Role-play will encourage self-awareness, while role reversal will contribute to the student's understanding of empathy, of knowing how *the other side* perceives engineers. Indeed, this need not be confined to specifically engineering concerns. However, such context-specific role-play will help to cement those skills within the engineering framework.

Building opportunities for reflection will also contribute to greater EQ understanding as the students become more self aware. Another study in software engineering found that reflective essay tasks generated gains in student development activity, the students saw the impact of their practices and began to connect practices with potential improvement strategies. Furthermore, the students could also articulate the influence of their own work and motivation on the quality of output, thereby engendering a deeper under-

standing of the subject [23]. In this example, incorporating a greater emphasis on communication activities served to enhance EQ aspects, including more active participation, greater self-control and awareness, heightened motivation and a better understanding of course material.

Teamwork and cooperation will help engender EQ qualities and are particularly important skills given the high level team-based environments in industry. This will include negotiation skills between team workers.

CONCLUSIONS

Language and communication skills are recognised as important elements in the education of the modern engineer, including English for specific purposes. Yet, there seems to be limited implementation of English courses globally, despite its current *lingua franca* status. Those institutions that have already implemented multilingual and communication elements will be at the forefront of providing the demands of industry and society.

The incorporation of several components of the fundamentals of emotional intelligence in education will facilitate advanced communication skills. However, given the traditionalist nature of many engineering curricula, this may take some time before change is evidenced.

The incorporation of language and communication improvement courses is an important element of continuous learning, and will ultimately contribute to the process of life-long learning. This should in turn facilitate advancements in engineering and, indeed, engineering education through streamlining fundamental communication skills.

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BIOGRAPHY

Marc Jorrit Riemer graduated with a Bachelor of Arts (Hons) in English in 1990, and a Bachelor of Business (Business Administration) in 1995, both from Monash University, Melbourne, Australia. He has worked for several years in the private sector, including as a Sales Administration Manager for an Australasian wholesale electrical distribution firm, and has been the Administration Officer at the UNESCO International Centre for Engineering Education (UICEE), based in the Faculty of Engineering at Monash University, since December 1999. He is also the Assistant Editor of the UICEE's *Global Journal of Engineering Education*, as well as several other publications of the UICEE.

With his qualifications, he seeks to build a bridge with other disciplines in the development of engineering education, particularly in the field of communication and English skills, and has presented several papers in this field. His research interests include English and communication skills development and emotional intelligence (EQ) issues in relation to the education of engineers.