Research Paper

Necessary Skills in English for Korean Postgraduate Engineering Students in London

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Contextualisation

This study explores the needs in English of Second Language (L2) learners, which is considered as a key stage of the planning of English language education (Dudley-Evans and St. John, 1998) in the area of English for Academic Purposes (EAP). It has offered a view of EAP and needs analysis with special reference to the engineering academic context. This research focuses on the perceptions not only of engineering lecturers but also of L2 students.

Abstract: *This paper aims to investigate needs for skills in English of Korean postgraduate engineering students in an academic community. In raising these issues, this research compares the perceptions of Korean postgraduate engineering students themselves and subject lecturers in an institution of science and technology in London by using semi-structured interviews. The research showed that a balanced command of English skills integrated with academic practices of the engineering discipline was seen to be required for students. Considering the demands of participation in a global academic community leads to the conclusion that Korean engineering students need to be equipped with multiple skills and discipline-specific literacy. This paper discusses the implications for upgraded EAP programmes adapted to the needs of Korean engineering students.*

Introduction

Learners' needs and purposes of learning English have diversified in the current era of globalization (Tudor, 1997). In particular, the situation of higher education which created the need for EAP courses in the UK and Anglophone countries was explained by Hyland (2006, p 2):

> Student populations have become increasingly diverse, particularly in terms of their ethnic and linguistic backgrounds and educational experiences, and this presents significant challenges to university academic staff.

The engineering academic community in the metropolitan city of London has also changed the conditions of using and learning English for communications, encompassing the great number of foreign students or immigrants that are studying English for academic or survival purposes. In the academic year 2003-2004, for example, in the department of Materials Engineering at Imperial College (IC) in London, the per centages of non-UK undergraduate and postgraduate students were up to 33 per cent and 44 per cent , respectively (McPhail *et al*, 2004).

As collaboration and communication among academic associates have been distinctly emphasized in the academic enterprise in UK universities, the majority of overseas students have demanded appropriate skills for efficient communication. Although some engineering students probably already have adequate English and tend to be highly motivated regarding the technical part of academic work, they may still have communication difficulties with the management of the appropriate skills in English. For these reasons, most UK universities have generally set up EAP programmes, charging them with the responsibility of helping

overseas students reach their full academic potential. Hyland (2006, p 3) describes the changing needs of communicative skills of L2 students in the contemporary era of globalization as:

> The learning needs of all these student groups have a particular focus in the challenges to communicative competence presented by disciplinary-specific study, by modes of teaching and learning, and by changing communicative practices within and outside the academy… At the same time, employers and professional bodies seek evidence of graduates' general workplace – relevant communication skills – skills which need increasingly to be adaptable to new, often unpredictable contexts of communication.

In line with these contextual and social challenges for EAP, this paper seeks to understand the perceived needs of Korean postgraduate engineering learners in terms of communicative skills at Imperial College (IC) in London.

In this study, the concepts of *skills* in English are divided into language skills and study skills. *Language skills* refer to four skills: listening, speaking, reading and writing, which are used regardless of academic practices. *Study skills* include wide-ranging sub-skills, such as abilities, activities, strategies, techniques and personal aspects of efficiency, in the academic practices in the community. The term 'skills' in English is nowadays contentious and challenged by the concept of 'academic literacies' (Lea and Street, 2000), which is supported by this study. Nonetheless, this study uses the term 'skills,' simply because engineering academics may be more familiar with the term and the concept of academic literacies incorporates the notion of skills (Lea and Street, 2000).

The Changing Concepts of Needs Analysis in EAP and Globalization

While the interest in and role of EAP have widened and diversified with globalization, EAP has retained its central concerns with learners and learner neEds This section will investigate the relationship between EAP and needs analysis, concepts of and approaches to needs analysis and the meanings of perceived needs in the global age. EAP can be theorized as "the needs-related nature of teaching" (Dudley-Evans and St. John, 1998, p 1). The major focus of needs analysis in EAP has been on how effectively EAP teaching can be relevant to learners' purposes and contexts of learning. Such analysis is a crucial starting point when deciding the contents and methodology and when designing syllabuses and lesson plans (Flowerdew and Peacock, 2001; Hyland and Coles, 2006; Mok, 1987; Tickoo, 1987), especially in tertiary academic settings. Accordingly, needs analysis and approaches to EAP have been responsive to learners' real-world communicative requirements when learning English within a specific context.

The term 'needs analysis' became a pivotal one with the appearance of English for Specific Purposes (ESP) in the 1960s at the Makerere Conference (Commonwealth Education Liaison Committee, 1969, p 19 in West, 1994, p 2). The general background of the development of needs analysis is explained by Tudor (2001, p 6) as mostly due to the increased need for language learning to relate to communication in international milieus. The expanding desire for EAP to enable people to operate in special domains of use in international settings called for needs analysis, in accordance with environmental factors such as economic expansion and the growth of science and technology (Dudley-Evans and St. John, 1998). The diversity of students' ethnic, linguistic and educational backgrounds and the growing professional and institutional expectations of competence in "dealing with the social, cultural and ideological contexts of language use" in the global community have also enhanced the importance and requirement of needs analysis in EAP (Hyland, 2006, p 5).

Given that EAP is mainly focused on learners' communicative purposes within a sociocultural context, it is essential to decide what learners' needs are, and how they can be identified and analysed in the given context. That is, the scope and approaches of needs analysis, based on "what people see as needs" (McDonough, 2005, p 59), have continually evolved and varied according to the learning situations that researchers have dealt with (Braine, 2001) and evolving faculty and student needs (Stoller, 2001).

The early research on needs in EAP underwent stages of identifying special linguistic dimensions such as register analysis (Ewer and Latorre, 1967; Halliday *et al*, 1964) and rhetorical or discourse analysis (Allen and Widdowson, 1974; Trimble, 1985), in pursuit of suitable teaching materials for learners, predominantly for scientific and technical contexts. Since the early 1970s, however, there have been major paradigm shifts in EAP research and pedagogy from attention to the surface forms of language to a focus on the direct needs of learners. An EAP approach specializing in the communicative needs of students has been seen as a humane activity, because it can incorporate a wide variety of needs related to students themselves. As Dudley-Evans and St. John (1998, p 126) state,

> the aim (of needs analysis) is to know learners as people, as language users and as language learners; to know how language learning and skills learning can be maximised for a given learner group.

EAP researchers have hence been interested in "describing the types of tasks, skills and behaviours required of learners" in the future target situations (Benesch, 2001, p 9). Significant research has been done regarding target tasks and the sets of skills required for carrying out academic tasks (Horowitz, 1986; Johns, 1981; Munby, 1978; Ostler, 1980). The analysis of targets has been based upon pragmatic perspectives, in order "to provide students with the writing skills and the cultural information… to perform successfully" (Reid, 1989, p 232 in Benesch, 1993, p 711). However, the notion of skills transferable to future target academic settings has been challenged, because these skills presumed an underlying common reasoning process, regardless of disciplinary areas and for all levels of learners, from primary to tertiary, from native speakers to non-native speakers.

"Doubts about the generalizability of study skills from one context to another" (Benesch, 2001, p 11) and "the possibility of a mismatch between institutional demands and learners' perceptions of what they need" (p 42) led to the analysis of participants' perceptions, that is, subjectively felt needs of students (Dudley-Evans, 2001) as identifiable elements of their situations, skills and behavioural neEds The research mostly includes "reactions of students to assignments and the processes they go through in fulfilling them as well as faculty reactions to students' participation and writing," and recognize teaching and learning "as an interactive social practice" (Benesch, 2001, p 11).

Since learning a language is not just a mental process but a process of negotiation between individuals and society, the conclusions of needs analysis in EAP are constantly checked and re-assessed according to individual and social changes (Hutchinson and Waters, 1987). Therefore, it is crucial to identify learners' subjectively felt needs in EAP, so that the social relationship of language learners and their context is not neglected. These subjectively felt perceptions are also the focus of the present study.

Globalization has made analyzing participants' perceived needs in EAP more essential than in the previous era. That is, because of the expanding and changing social situations of globalization, there is a considerable demand for EAP teachers to assess these students' perceived needs in the contemporary context (Hinkel, 2006). It becomes crucial for the EAP profession to develop appropriate tools for identifying learners' subjective communicative needs within the global community and to translate them into coherent course structures.

Methods

The research reported here is part of a larger qualitative study of needs analysis of Korean postgraduate engineering students. Since IC is an internationally well-known institution of science and technology, it may be safely assumed that all the students (ICSs) and lecturers (ICLs) are highly academically talented and have scholarly motivation in their fields of engineering. At IC, the total population of Korean postgraduate engineering students was quite small. In total, there were only 23 Korean engineering postgraduate students registered at the college in the academic year 2003-2004. For this reason, the number of lecturers who had an academic relationship with one or more Korean postgraduate students was assumed to be small too. Therefore I attempted to use the snow-balling technique to collect data (Cohen *et al*, 2007), while I used semi-structured interviews for this study. I first obtained 15 sets of interview data from Korean postgraduate students through face-to-face encounters in the meeting of the Imperial College Korean society. I was also able to collect five sets of interview data from the lecturers at IC. The semi-structured interviews focused upon participants' in-depth opinions and explanations. During interviews, in order for me to understand the current situations of their communicative skills, I encouraged students to describe these in association with their previous study backgrounds, the current aims of their study and their plans for the future. I also asked them to think about their supervisors' or instructors' degree of satisfaction with them, as well as the extent to which they themselves were satisfied and what their strategies were for dealing with academic practices in engineering.

Most of the ICS participants were studying in the Electronic or Mechanical Engineering departments with the population of nine PhD students, three MSc students and three Post Doctor level students. (To differentiate PhD, MSc and Post Doctor levels in analyzing interview data, I put letters P, M or PD after the students' codes. Ex. ICS-1P.) All were Korean, and their length of stay in either the UK or another foreign country ranged from six months to 15 years, with the majority having studied in the UK for more than two years. Of the five ICLs who were interviewed, three lecturers were from Britain, and two were from Spain (ICL-1) and India (ICL-4), respectively. Four were working in the Mechanical Engineering department and one was in Materials. Two lecturers had an academic relationship with Korean PhD students, two had relationships with both PhD and MSc levels and one had been working with MSc students for a number of years.

Results and Discussion

To begin with, I enquired into the participants' perceptions concerning the relative importance of the four language skills for students and the reasons for this in their situated contexts of engineering. Participants were often not able to separate each language skill, but they highlighted the need for the integration and balance of language skills in academic practices at IC.

> All four skills are important and I am weak in all skills (ICS-16PD).

Within engineering, the lack of any one language skill may have serious consequences for students when they perform academic practices in their community. For example, the demands upon PhD students for oral presentations of their ideas were quite remarkable and almost as important as writing papers. Those demands are greater than in humanities or social science subjects where, even if their spoken English is not good, students can rely more upon reading and writing papers.

> In PG level, for the first two years, once a year we normally present and there
> are extra presentations for visitors. After submitting the thesis, we present at the

conference... In my department, when examining our thesis, the content of the thesis is 50 per cent and the other 50 per cent is presentation (ICS-6P).

Additionally, participants emphasized the inseparable relationship of reading and writing skills.

I think if I write well, that also means I can read well (ICS-8P).

This is probably because these skills constantly interact together in text processing (Johns, 1997, p 12), and the reading of source texts in the appropriate genres carefully and extensively provides resources, and promotes the modelling and recognition of typical features in the discipline (Reid, 1988 in Flowerdew and Peacock, 2001). As Shaw (1991) demonstrated, this composing process was most frequently used by science and technology postgraduate overseas students at Newcastle University in the UK. Academic writing processes may include a creative organization of authors' ideas through reading related models in a range of genres, as well as a process of creating and discovering meaning (Zamel, 1982). Therefore it is beneficial if engineering students are supported through EAP programmes by knowledge of genres, structures, rhetoric, registers and conventions of writing in their discipline.

We may conclude that it is unsatisfactory to instruct students in reading or listening skills separately in the way that students have been taught traditionally; they should be able to adopt all language skills collaboratively and competently when studying in the discipline (Benson, 1989; Canagarajah, 2006; Coleman, 1991). As Hinkel (2006, p 113) states, language learning now seems to place "an increased value on integrated and dynamic multi-skills" "to increase learners' opportunities for L2 purposeful communication, interaction, real-life language use, and diverse types of contextualized discourse" (p 114). Students need to employ *multi-skills* as essential components for meaningful communication throughout their academic lives in the era of globalization.

At the same time, while each language skill is essential, a different emphasis at different stages of students' academic progression should be made over the long academic training period. Postgraduate students seem to require reading as a precedent activity, to gain information; they then need speaking and listening to discuss and negotiate interactively in supervision or seminars, and later they need writing for assessment.

You can't say that one is more important than the other. Obviously, listening and comprehending are the first steps, but then communicating by speech and by writing is equally important in the engineering field (ICL-4).

This sequence is different from the conventional language teaching or audio-lingual approach, in which the progressive pattern is listening, speaking, reading and writing (Benson, 1989).

Furthermore, a great number of respondents indicated that 'good' language skills and study skills depend on a clear understanding of contents and conventions of engineering. For example, proficiency in study skills such as those needed for oral presentations and writing papers is premised on acquiring an understanding of disciplinary knowledge by reading much relevant literature.

Subject knowledge and presentation are deeply related to each other… Likewise, writing the PhD thesis is totally different from writing a normal letter, so the academic styles, terms, and structures are different. We definitely need to have academic English skills for our subjects (ICS-8P).

Other skills, such as the logical development of ideas, reading and searching for useful information and establishing research directions, are all fundamentally grounded on solid

engineering knowledge and conventions. These examples clearly indicate that for engineers the use of literacy in English is incorporated with the knowledge and epistemology of the discipline.

Although students considered that the competent use of skills simply depends on the acquisition of skills and disciplinary conventions, lecturers argued that students need to negotiate and debate with lecturers and that students should use their own words, 'find a voice', with their own ideas, rather than simply adopting strict rules and conventions.

> While for undergraduates, reading and citing books and work which people have done are important, if you come to PhD , it is important to put their work into their own words, for example, *I* have done such and such an experiment and the outcome of the experiment is X, Y, and Z. That is, writing an article, writing their own ideas are important (ICL-1).

Lecturers seem to suggest that students should participate in existing dominant practices, and should challenge and negotiate conventions in the context (Lillis, 2006). This indicates that postgraduate students are required to acquire 'academic literacies', rather than transferable 'atomized skills' or 'socialization' (Lea and Street, 2000). The acquisition of academic literacy will obviously promote improved communicative practices for Korean postgraduate students within their field.

Moreover, ICLs stressed general communication skills and English pronunciation and grammar. These preferences seem to reflect views on the functions of English and skills. English and skills were perceived as being important for social interactions and communication in the classroom. Therefore to be a proper engineer in the global community, students should be equipped with both general communication skills as well as specific literacy for engineering. This is especially true because engineering, a communication-based discipline, requires students to communicate with a variety of people in real-life situations. Therefore, students may require *flexible* combinations of both general and specific skills within the continual modes of EAP programmes, depending on needs of learners in the situated context of engineering.

Students participate in various academic practices, such as participating in lectures, presenting at conferences, writing research articles and reading academic textbooks. Students thus have to deal with these skills in English, resulting in certain effort and problems. Although Carkin (2005, p 92) stated that academic success largely depends on L2 students' negotiation of lectures, textbooks and research articles, this study shows that there are more extensive and complex requirements for engineering students' academic success, including the ability to make oral presentations and to benefit from supervision as academic practices. These findings indicate that the requirements for postgraduate engineering students are expanding, encompassing more spoken practices in the engineering community.

During *lectures*, competence in understanding and listening were the first priority, according to lecturers.

> I think listening and understanding in lecture and discussion*,* I have made that number one, the most important (ICL-2).

Such competence was considered more important than note-taking, a view which agrees with Ferris and Tagg (1996). Benson (1989, p 436) also showed that note-taking skills isolated from the study tasks cannot guarantee learning in lectures. Although in previous years note-taking in lectures was more important than understanding lectures and questions raised by colleagues (Zughoul and Hussein, 1985), nowadays students are often given handouts for the lectures at the beginning of the courses, and note-taking skills seem to be less in demand.

ICLs particularly emphasized the need for students' active participation and interaction in the lectures, exemplified by asking additional questions. ICLs believe that explaining the real value of knowledge in lectures is central to their work as lecturers. ICLs seem to consider that knowledge is socially constructed and is shared by a dialogic activity of participating in lectures in the UK classroom.

> If you could simply study engineering and learn engineering by reading a book then I wouldn't need to be in my job. I would do something else for a living. So clearly the added value you receive coming to somewhere like this to study is that people talk to you about the subject and explaining to you, and that's the real value, and that's why I am being paid to do this job which is to explain things to people so they get to understand what I am saying (ICL-2).

Although *specific terminology* is considered as the major tool which defines each disciplinary culture (Flowerdew and Miller, 1995, p 366). Some students (mostly MSc students) commented that they struggle because they lack enough resources or references which explain new specific terms, and lectures are their only source for gaining knowledge of these terms. In this regard, participation in lectures is very valuable.

The participants advocated various skills as useful for *reading the literature,* such as skimming and scanning for efficiency and speed in extracting key points, constructing meanings from background knowledge, searching and selecting literature relevant to producing students' own research design, and repetitive reading to understand concepts in engineering.

> Reading is also difficult. I read papers over and over again, not because of English, but to understand the contents (ICS-13P).

Although some students believed that they were used to reading texts through long periods of study, reading was still a very demanding practice. This is because students read to perform academic tasks (Donald, 2002), not only for pleasure. Although students understand subject terms, they sometimes may not understand examples in texts which have strong cultural connotations, because readers may interpret texts differently when negotiating meanings in different social settings (Parry, 1996; Wallace, 2003, p 7). Reading and understanding may also take time. That is, at the beginning, students normally read superficially with partial understanding. As they gain more subject knowledge through reading widely with appropriate influences such as supervisors' comments, their understanding becomes clearer. Despite the difficulty in reading the literature, students are often not trained in reading strategies for disciplinary contents (Nuttall, 1996 in Flowerdew and Peacock, 2001). Students may require systematic reading instruction for their discipline.

For PhD candidates, *supervision*, as the major practice in the UK educational system, was not seen as just directing or guiding students in the directions which supervisors want; supervision was considered to be a process of interaction between students and supervisors including negotiation, debate, answering and explaining.

> For PhD, oral skills, when they see the supervisor, they need to understand what the supervisor is saying. Development of these skills, with listening and comprehension as well as being able to debate, are important skills for PhD students (ICL-1).

Leki (2006, p 148) similarly stated that supervision is "a part of the learning process to negotiate the socio-academic relationship" in America.

In particular, for engineering PhD students, as "junior members" (e-mail communication with ICL-5 in August 2007) of the global academic community, the skills of presenting their own work and findings to the international conferences and journals are inevitably emphasized, because students are eagerly expected to join the global community. As "public behaviours" (Coleman, 1991, p 17), the use of these skills is anticipated to conform to the norms of the global academic community. Although students mostly remain in their local contexts, all courses in these contexts are considered as training them to go further, to participate in the global community of practice. Throughout students' postgraduate courses, writing and speaking practices in the global forum not only accelerate the formulation of their engineering ideas, but also offer opportunities to glimpse the expectations of the global community.

For this reason, students are strongly required to *present* their ideas and research at international meetings and conferences. However, students may face enormous challenges to their English competence and oral presentation skills. Moreover, the mainstream academic culture in Korea does not positively enable students to present their findings and arguments clearly and logically at seminars or conferences. Students who were influenced by the academic culture in Korea tends to place value upon listening rather than presenting ideas, and students express their findings reluctantly at conferences compared to those from other nations. This may result in serious disadvantages for their research careers, because engineers from different countries may misunderstand the reluctant behaviour of Korean students due to a lack of knowledge in their research.

> During conferences, formal presentation skills are really important. Even if we have researched the subject well and explained it very well in writing, if we don't have good presentation skills or speaking manners in front of other people, it is a problem. Sometimes nobody can understand my or my Korean colleague's speaking, because we are not confident in the pronunciation and grammar of English… Anyone who present well look confident and seem to have great knowledge. To present well, we must read literature and we should be able to defend all areas (ICS-8P).

Therefore students need to be offered more opportunities and space to exercise oral presentation skills and become acquainted with international expectations during their academic years. Such skills include the use of appropriate tactics such as emphasizing key points and providing clear expressions with a confident attitude.

In particular, *poster presentation* is a new kind of genre and a new modality, using different drawings, visuals, diagrams and other resources. "A current preference for the new modalities" emphasizes "multimodality and the increasing importance of visual literacy and the new technologies, which involve different, non-linear ways, of drawing from text" (Wallace, 2003, p 8). Even if Korean students are not confident in English, they can use a particular mode of presenting information at poster presentation, which includes all kinds of textual possibilities within new or old technologies.

Students perceived that *writing* demands solid logical thinking and clear explanations of problem-solving processes (Donald, 2002) for global publications in the disciplinary community. At IC L2 students were forced to attain certain writing scores in formal examinations in English before entering engineering courses, and to take EAP writing support programmes to facilitate writing skills for their discipline during postgraduate courses (IC website). Additionally, ICSs had numerous chances to write in various academic genres such as reports, articles, theses and examination papers. Therefore they seemed to have a clear understanding of features of disciplinary discourse such as logical statements of ideas and connections, and the need to consider target readers and conventions in academic writing. ICLs also emphasized that expressing research findings and ideas with effective

communication skills is more important than the findings themselves, and posited the improvement of writing as a training process enabling students to be qualified researchers in the community.

> I am well aware of the importance of teaching transferable skills to students, as after several years of education at IC, employers look for evidence of students' writing and presentation skills. It doesn't matter how wonderful the research you've done. If you don't explain it in writing, if the managing director cannot understand the title and abstract, then it's a failure as an exercise (ICL-5).

Conclusion

In this paper, I have made use of data on engineering academics' perceptions regarding Korean engineering students' needs in language skills and study skills. Contrary to my prior assumption that there must be different preferences for language skills among the groups of Korean students and lecturers at IC, both groups of participants agreed that students required to be equipped with a flexible combination and balanced competence of all language skills, in order to fulfil real-life communicative tasks and to engage in meaningful conversations in the engineering community.

Engineering academics also clearly acknowledged the importance of discipline-specific study skills for their study practices, indicating that the use of skills is contextualized in the discipline rather than transferable to other disciplinary areas. That is, "knowledge" is seen as "a 'language game' that is maintained through the interaction of community members" (Canagarajah, 2002, p 30). More than this, lecturers proclaimed the needs for postgraduate students to negotiate and debate with lecturers and to write their own ideas in their own words, rather than simply accommodating rigorous rules and conventions. Students were thus required to access 'academic literacies' (Ivanič and Lea, 2006) for their practices in the discipline. At the same time, engineers were required to have general communication skills for social interactions and communication with engineers or other people of diverse nationalities. Therefore, to be a proper engineer in the global community, students should be equipped with both engineering-specific literacy and general communicative competence. By way of conclusion, well-organized EAP programmes focusing on multi-skills instruction and including disciplinary culture and conventions may provide students with better preparation for participating in academic practices in the global community.

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