

Technical English in Japanese Universities: ESP or Diversity?

Anthony ROBINS* and Brian CULLEN**

**Department of Foreign Languages, Aichi University of Education, Kariya 448-8542, Japan.*

***Department of Language and Culture, Nagoya Institute of Technology, Nagoya 466-8555, Japan.*

Introduction

When ESP (English for Specific Purposes) began to change teaching styles in the 1960s, it was assumed that English courses at universities would become more and more subject-specific in order to take account of the needs of individual groups of students. Despite this world-wide trend, teaching of technical English and other varieties of specific English has never really been fully developed in Japanese universities. In this paper, we would like to investigate to what degree specificity can be increased, with particular reference to technical English provision at one Japanese university and to a questionnaire given to teachers involved with these classes. We show that greater specificity can only successfully be achieved if the diverse needs and aims of both students and teachers are carefully considered, assisted by the development of dedicated coursebook material.

1. Historical background

During the Meiji era at the end of the nineteenth century, and even until relatively recently, the main goal of learning technical English was to acquire knowledge from overseas through translation. The transition of the Japanese economy from agrarian to industrial was achieved by first copying this translated technology and later by innovating it. Since the main purpose of a knowledge of English was an understanding of imported foreign texts, English education in Japanese universities focussed on translation and generally employed the grammar-translation method. This method was considered successful for many years in assisting the flow of technology from other countries into Japan, but its efficacy has come under investigation and criticism over the last few decades. eg. Law (1995), Gorsuch (1998).

From the 1960s, Japan became a major exporter of technology and the need for something more than translation skills increased. English was increasingly needed for international business communication and for technology exchange. Oral communication and writing skills are now as important for many engineers as reading skills. Preparing students for these changing requirements has been a major challenge for Japanese technical universities. In many cases, this challenge has not been adequately answered and English teaching has not substantially changed.

Spurred by these developments, some universities have answered this challenge by taking advantage of developments in ESP (English for Specific Purposes). As will be indicated in greater detail, ESP is an international movement which attempts to take learners' needs into account in designing courses and teaching. ESP therefore also assumes that by accurately accessing those needs, course designers and teachers can provide highly specific English courses to match students' requirements.

2. Location of the study

The subject for this study, Nagoya Institute of Technology, located in a city in one of Japan's industrial heartlands, was established in 1949 although its roots go back to 1905. As its name suggests, its students are all studying branches of technology, although these range from architecture to electrical engineering, and from civil engineering to systems management. This itself shows a degree of diversity which will be returned to. It can be stated that, as a national (state) university, students have reached a certain required level of

academic attainment. However, although English is a compulsory subject for the university's entrance examination, interest and ability are diverse. Communicative ability may only average 'low intermediate' level and many students can even be classified as 'false beginners'.

In 1995, a one-semester elective course in technical English was started. In 1998, this course became compulsory and was extended to all second year students. Initially, teachers were free to choose their own materials and teaching methodology for the technical English classes. However, not all teachers had experience in ESP. The training and experience of many involved in the courses was in teaching general English rather than in ESP and they were not necessarily familiar with textbook selection or course design for technical English. In addition, both part-time and full-time teachers were involved in these courses. These factors contributed to a need to more greatly unify courses. To achieve this, in time for the 2000-2001 academic year, four of the full-time faculty produced a coursebook entitled 'Technical English Techniques' (Robins et al, 2001). While intended to act as a standard textbook for all technical English classes, it provides a diversity of learning activities.

In the future, there is a high probability that this one semester course for second years will be extended to a full-year course. In addition, the course for first year students will gradually be changed from general English to a course which takes greater account of the type of technical students that the university caters to. This movement towards specific courses is a major investment in resources for the university as well as a major shift of emphasis away from the traditional general English courses offered at most universities. Before considering teachers' views as revealed in replies to the questionnaire, it is necessary to reflect on what a shift to ESP involves.

3. ESP

Views on what constitutes ESP (English for Specific Purposes) are varied. As Widdowson (1998) succinctly states, "in one sense all uses of English, as of any other language, are specific." However Hutchinson and Walters give a more prevalent view of the origins of ESP in their book, *English for Specific Purposes* (Hutchinson and Walters, 1987). They describe how, after the Second World War, the power of the United States and the residual influence of the British Empire transformed English into an international language. In contrast to the past, when a foreign language was seen as part of a broad education, as English strengthened its position as a language of technology and business, learners were often studying English for very specific purposes such as selling products overseas or negotiating sales contracts. This led to the first central idea of ESP that the needs of the learners should be at the center of every learning situation. These needs were to be established by 'needs analysis', as discussed by Nunan (1988) and Graves (1996) among others.

Simultaneously, research into different genres reinforced the view that there were important differences between the types of English used in these genres. If this were true, then a learner with a specific purpose could learn sufficient English very efficiently if the teacher or course designer focussed on the linguistic features of the required genres. For example, an ESP course for engineers would teach the features of English which appeared in papers, manuals, and other documents aimed at engineers. Applying this to students who were learning to become engineers, the obvious route was to use texts from the specialist area which were written in English. Thus, the second central idea of ESP was to focus on the varieties of English that were specifically required by the learners.

While Widdowson (1998) seems to agree by stating that "English for Specific Purposes implies that it is English which is somehow peculiar to the range of principals and procedures which define that particular profession.", he stresses that economy of learning is rather achieved by membership of a discourse community which shares schematic knowledge which crosses language barriers. This view is subscribed to by Swales (1990) who links subject-specific genres to particular discourse communities. Learners must understand the principal genres to become full members of that discourse community. These genres may include the use of vocabulary in ways that are specific to the discourse community, but also include the ethical and professional attitudes that are implicit in the genres of that community.

However, there is also discussion on the kinds of features 'unique' to different genres. To take several studies, Jackson and Bilton (1994) confirmed discourse features typically prevalent in science (geology) lectures and 'the technicality of vocabulary'. Chia et al's 1999 study of medical students in Taiwan found that both faculty and students saw limited specialised vocabulary as a key problem. However, when looking at the problems of science students studying overseas, Dong (1998) found that problems of grammar and mechanics were the foremost among fifteen areas of help which students perceived themselves as needing and an area of difficulty which would seem to be common to 'general learners'. Taking one specific example of problems of grammar and mechanics, proponents of ESP have pointed out the high incidence of passive forms of verbs in scientific papers (up to 20%). However, opponents countered this by indicating that this left at least 80% of verbs in these papers in the active form. Therefore, even if the passive is used more frequently in scientific English than in general English, the active is still far more widely used and therefore arguably deserving of greater attention to make the best use of limited study time.

4. Student diversity

As stated above, a central premise of ESP is that we should primarily consider the needs of students. Although the needs of the learner are clearly important, it is not so clear that those needs are easily established. While many studies promote a focus on specificity in college English programs, examples of these show a greater homogeneity of purpose in learning situations which contrast with the university under study. Parkinson (2000) stresses specificity through a theme-based course, particularly concerned with writing reports on scientific experiments. However, her students were students in an English medium college in South Africa for whom English was a second (rather than foreign) language. Chia et al (1999) show that even in a country such as Taiwan where English plays a similar role to Japan, a college specialising in a narrower area, medicine, as opposed to wider technology and science, can offer greater specificity. However, other studies illustrate the difficulty of specificity in a wide range of tertiary education. Included among these are Pusey and Pusey (1987) who distinguish between Colombian university students' short-term needs (and motivations) and long-term professional needs, with the latter often unclear.

Indeed, in the context of students at university who will not graduate for several years, it is difficult to ascertain exactly what their English needs will be. Robins (1998) discusses the types of diversity in greater detail, including the division between students who subsequently pursue postgraduate studies and those who find employment in a number of different kinds of jobs. In a questionnaire about future plans given to a group of 80 second year students at the university in 1998, 45% planned to study to a higher level versus 55% who intended to work after graduation. Comparison of this with university statistics shows that this is a typical division. Therefore, teachers will work with students who may need to use their English as a part of graduate studies and those who may need it primarily for occupational purposes. Even in their college days, students' English needs may differ according to their chosen field, as the university offers major courses in seven main fields. To take account of this diversity, an attempt has been made to divide English classes according to specialisation. This has been partly successful, but administrative concerns mean that different specialisations are still mixed together in a single class. For example, one particular group consisted of students studying chemical engineering, civil engineering, and systems management. Even if students are divided by specialisation, this fails to take account of the levels of their English ability, so it is likely that any particular class will have a large ability range.

5. Questionnaire: diversity among teachers

Having shown that there are problematic areas in both the degree of 'uniqueness' of language used 'for specific purposes' and in the breadth of ability, specialisations, and future objectives of the students, we will now consider the results of a questionnaire to teachers at the university. While a central tenet of ESP has been referred to, in its concern with analysis of students' needs, it is also both necessary and useful to consider aspects of teachers' beliefs and aims concerning the teaching of technical English. In order to determine the

Figure 1: results of the questionnaire administered to teachers of technical English

Instructions given: Please choose one answer from these seven. Each answer can be used as many or as few times as you wish:

	1: I agree strongly	2: I agree	3: I agree slightly	4: I neither agree or disagree	5: I disagree slightly	6: I disagree	7: I disagree strongly
Technical English is a lower priority for NIT students than improving their general English skills. <>	*		+	+	+	*	*
				+		*	+
			*	*		*	
			*	*		*	
Material to be used in Technical English classes should be very subject specific (ie: closely related to Civil Engineering for Civil Engineering students or closely related to Electronics for Electronics students).	+	*	+	+	*	+	
			*	*		+	
						+	
						+	
As classes are taught by the Department of Language and Culture, one important aim which can be achieved by Technical English classes is to expose students to broader issues resulting from technological development, such as ethical and environmental issues.	+	+	+	*		+	
	+	*	*				
	+	*					
	+	*					
		*					
In students' main subjects (outside the Department of Language and Culture), Technical English should be taught by using English as the medium of instruction in classes.		+	+	+	+		+
		*	+	*	+		
		*	*	*			
				*			
Teachers should focus on specialised structures for technical English, eg. as used in writing for research papers.	+	+	+	*	+		
	*	+	+	*			
	*	*	+	*			
			*				
<> one respondent considered this too difficult to answer		non-native speaking teachers indicated by	native speaking full-time teachers indicated by				
	*	*	+				

degree and nature of diversity in teacher attitudes and beliefs, we administered a questionnaire to fourteen teachers. These teachers replied to five statements posed on the overall theme of 'the focus of technical English'. For each question, they were invited to give their response by choosing one indicator on a seven point Likert scale. The statements and responses are indicated in Figure 1. Although both full-time and part-time teachers responded to the questionnaire, and differences between full-time and part-time teachers may be expected to exist, related to their amounts of teaching experience in this environment, the only distinction made here is between NS (native speakers) and NNS (non-native speakers). This distinction is considered, on the basis that the two groups will have contrasting language learning backgrounds, as native-speakers and non-native speakers, and contrasting language teaching backgrounds. While most NS teachers' experience has been grounded in communicative language teaching, non-native speakers are more likely to use the grammar translation methodology referred to earlier in the paper. Finally, the non-native speakers typically had a distinct academic background in literature or philosophy. Given the small size of the sample, conclusions drawn from the results are seen to be valuable when based on a qualitative assessment, as well as a purely quantitative one. Therefore, some individual comments are referred to in the following discussion. These comments were invited in the questionnaire in addition to the responses on the seven point scale.

Each of the five statements in the questionnaire was intended to draw out attitudes on a specific aspect of the rationale for the type of teaching suited to technical English. Statement 1 judges perceptions of priority considering the level of students' English proficiency. As was indicated earlier, the level of students' oral English skills in this learning environment is only seen as 'false beginner' or 'low intermediate'. Therefore, it might be hypothesized that teachers will consider that students are not ready to move on to more specific courses, which may entail higher level language skills. However, the responses show that this is not the case, with eight subjects disagreeing (to various extents) that 'technical English is a lower priority', and only two agreeing. NNSs show a greater degree of disagreement with the statement. It has to be said, however, that even if a respondent 'disagrees strongly', it can still mean that technical English is only considered 'as important as general English' rather than 'more important'.

In contrast to the question of how 'important' technical English is, statement 2 is essentially focussing on just how far it is seen as being beneficial to go in the direction of 'specificity' of courses. The extent to which very subject specific courses will be successful is shown to be an area of controversy, particularly among NSs. Objections indicated by additional comments include the difficulty for language teachers in dealing with specialised and subject-specific material, criticism of the extent to which technical English courses need to be subject specific given that there are seen to be core features common to scientific English, and even the suggestion that specificity should rather be related to individual students than to subjects. Furthermore, one respondent (NNS) stated the need for at least a general foundation course, with the words, "Subject specific classes would be useful, but probably should come after a good general technical English course." Although we earlier indicated that specificity is often equated with efficiency even at lower levels, responses to both statements 1 and 2 show that the teachers surveyed here rather see it as equated with higher level language skills.

Statement 3 focusses on the role of the teacher of English at the technical university. Traditionally, language classes have often had a literary focus. While it may be admirable to expose students to 'culture' in this way, a combination of limited time, students' interests, and their level of language mean that this may not be the most successful way to encourage interest and motivation in the language. However, it can be considered that many teachers do not want to be the purveyors of purely functional language training and, what is more, do not see this as appropriate at the tertiary level of education. One way to deal with such aspirations is by using language lessons to look at the ethical and environmental issues constantly raised by technological development. This aim is shown to be strongly supported by the results which indicate twelve respondents in agreement, as against only one in disagreement. Although coursebook material in use may have influenced the response to this statement, this agreement indicates that it can be seen as positive to include material looking at these issues, as has been the case with the two coursebooks produced for classes at the university. However, dissent was also indicated, with one respondent (NS) stating that there is no particular reason to use English, as opposed to Japanese, for dealing with ethical and environmental issues.

Statement 4 concerning the use of English as a medium for technology classes themselves was expected to raise various issues in respondents' minds. These would include the practicality of such provision, given the language skill level of students and attitudes and language ability of science faculty members. They would also include the perception that the autonomy of language departments might be reduced. Although six out of fourteen respondents 'agreed' or 'agreed slightly', with a greater tendency among NNSs, no overwhelming mandate is indicated for English medium technology classes. Such views are in contrast to the situation at many technical universities elsewhere in the world, where they predominate for various reasons.

Finally, statement 5 looks at the central issue of how different 'technical English' classes should be in the area of language forms studied. As we have shown, there is a debate as to how distinct these really are. It can be seen that there is a high level of agreement, which is even greater among NSs, that courses should reflect what is perceived as distinctive specialisation. However, such a broad statement cannot really adequately discriminate between respondents who may have varied attitudes to how specialised the skills should be. Only by phrasing a multi-part statement or question, including specifying a number of such skills, could more thorough conclusions be drawn. Furthermore, again dissent from specificity is indicated by one comment, which alludes to both statements 2 and 5, responding that, "It seems to me that most students are expecting broader knowledge. It might be necessary to consider this type of special class as an elective course." (NNS)

The results of the questionnaire show that provision of English teaching at technical universities, and the materials provided for it, have to take account of a wide range of views. The range of responses is never less than three points (on the seven point scale) and is as great as six points in the case of statement 1. This is not to say that any attempt to come to a consensus about the overall aims of a syllabus is doomed. Rather, it is essential to come to such a consensus, which leads to a final reflection on the central question of this paper, how different does English study for technical students need to be and what are the repercussions on material design?

6. Facing diversity

The previous sections have described the diversity that exists in three different aspects. Firstly, there is diversity amongst genres used in English, even within technical spheres that appear relatively similar. Secondly, there is great diversity among the language aims and abilities of students within a technical university. Finally, results from the questionnaire show that teachers have diverse beliefs about the nature and role of technical English courses.

In answering these diverse needs of technical English at tertiary institutions in Japan, one of the most powerful unifying tools is the coursebook. In this particular university, the progress in material design may best mark the evolution towards a role for English within the university curriculum. 'Technical English Techniques' (2001) has already been referred to, and is now being joined by 'Technology and Humanity' (Cullen, 2002). Like the former, this new book has strong communicative aspects and a core of technology related material. However, as the title suggests, there is increased emphasis on broader issues resulting from technological development, including ethical and environmental issues, interest in which is borne out by the results of the questionnaire. It is an attempt to answer the question as to how to balance breadth or specificity by aiming to encompass students' interests, cater for existing levels of ability, and provide for the range of future needs which has been referred to in this paper.

Conclusion

The extent to which the university language learning environment differs from the classic vocationally related ESP environment has been indicated. However, 'specificity' in the sense of a move away from 'general English' courses is an ongoing development, spurred by the need to increase levels of interest and progress among students. The results of the questionnaire to teachers, itself an attempt to involve them in the process of development, show that there is recognition of the importance of ESP, in the form of technical English.

However, there are concerns as to how great a role it can play, largely based on students' English skill levels and teachers' expertise in relationship to technology. The most positive route appears to be to make use of language teachers' expertise and interest by increasing specificity in such directions as the exploration of the ethical and environmental issues related to technology. A future study will look in greater depth at this particular area.

References:

- Chia H-R., Johnson R., Chia H-L. and Olive F., English for College Students in Taiwan: A Study of Perceptions of English Needs in a Medical Context, *English for Specific Purposes*, 18-2, Elsevier, 1999, pp. 107-119.
- Cullen B., *Humanity and Technology*, Intercom Press, 2002, pp. 137.
- Dong Y-R., Non-native Graduate Students' Thesis/Dissertation Writing in Science: Self-reports by Students and Their Advisors from Two U. S. Institutions, *English for Specific Purposes*, 17-4, Elsevier, 1998, pp. 369-390.
- Fredrickson K. M., Languages of the Law: A Course in English for Legal Studies, *The Language Teacher*, 22-11, 1998, pp. 23-39.
- Gorsuch G., Yakudoku EFL Instruction in Two Japanese High School Classrooms, *JALT Journal*, 20-1, JALT, 1998, pp. 6-32.
- Graves K., *Teachers as Course Developers*, Cambridge University Press, 1996, pp. 224
- Hutchinson T. and Waters A., *English for specific purposes: A learning-centred approach*, Cambridge University Press, 1987, pp. 424.
- Jackson J. and Bilton L., Stylistic Variations in Science Lectures: Teaching Vocabulary, *English for Specific Purposes*, 13-1, Elsevier, 1994, pp. 61-80.
- Larsen-Pusey M. A. and Pusey C., ESP in Colombian Public Universities, *English for Specific Purposes*, 6-1, Pergamon, 1987, pp. 45-52.
- Law G., Ideologies of English Language Education in Japan, *JALT Journal*, 17-2, JALT, 1995, pp. 213-224.
- Nunan D., *The Learner-Centred Curriculum*, Cambridge, 1988, pp. 196.
- Parkinson J., Acquiring scientific literacy through content and genre: a theme-based language course for science students, *English for Specific Purposes*, 19, Elsevier, 2000, pp. 369-387.
- Robins A. Technical English — Dealing with diversity, *Bulletin of Nagoya Institute of Technology*, 50, Nagoya Institute of Technology, 1998, pp. 1-6
- Robins A., Matsuura S., Deguchi Y. and Seguchi M., *Technical English Techniques*, Gakujutsu, 2000, pp. 129.
- Swales, *Genre Analysis*, Cambridge, 1990, pp. 272.
- Widdowson H., *Communication and Community: The Pragmatics of ESP*, *English for Specific Purposes*, 17-1, Elsevier, 1998, pp. 3-14.

(Received September 6, 2001)