Products, processes and practitioners: A critical look at the importance of specificity in ESP¹

Laurence Anthony

Waseda University, Japan

Abstract

Many English for Specific Purposes (ESP) researchers have argued that ESP practitioners should be sufficiently familiar with the specialist discipline of their target learners that they are able to understand its culture, community, and discourse practices. This view has led to the misconception that ESP practitioners must be experts in the target discipline or at least know the subject material as well as the learners. In this paper, I will argue the opposite view: that ESP practitioners do *not* need to be specialists. In a rapidly changing and evolving world, the traditional product-oriented knowledge taught to target learners in an ESP course is likely to quickly change or even become obsolete in only a few years. On the other hand, process-oriented skills, such as the ability to acquire new knowledge through observing, recording, and analyzing texts, are likely to be more stable and highly valued over the long term. These are the exact same skills that ESP practitioners themselves apply when attempting to understand the target language. Consequently, I will argue that non-specialist ESP practitioners are in the best position to help learners achieve these longer-term ESP goals.

Keywords: discipline-variation, knowledge, specificity, skills

1. Introduction

English for Specific Purposes (ESP) can be considered one of the dominant approaches to second and foreign language teaching, rivaling task-based and communicative language teaching approaches. Since its conception in the 1960s, the ESP approach has often been compared favorably to English for General Purposes (EGP) approaches, and its proven effectiveness has been attributed to its focus on the

needs of learners in a specific discourse community and its attention to grammar, lexis, register, study skills, discourse, and genre training (Anthony, 2009).

However, the success of ESP has also given rise to a misconception that ESP practitioners must be experts in the target discipline or at least know the subject material as well as the learners. This view has largely resulted from teachers assuming that ESP is a *product-based* approach, in which teaching focuses on the observable features of target texts (the products), such as vocabulary usage, grammar and discourse structure, and the positioning of information. Indeed, this was the dominant thinking when ESP was conceived. For example, Halliday et al. (1964: 190) described how the English needed for operating power stations in India (i.e., procedures, technical manuals, lists of specifications, etc.) could be observed, recorded, and analyzed, and then taught with confidence and certainty to learners. Today, on the other hand, it is inconceivable that ESP practitioners would adopt the same approach in preparing an ESP course, especially considering the time constraints they have and the fact that many ESP courses are composed of a heterogeneous group of learners from multiple disciplines or professions. In such a situation, ESP practitioners who see ESP as a product-based approach are likely to lose confidence and feel forced to rely heavily on published, mass-market ESP materials, as revealed in a review of ESP courses and programs in Japan (Terauchi et al., 2010). Others may turn away from the ESP approach altogether.

A loss of confidence in ESP teaching can also occur at the institutional level. If the management of an institution views the ESP approach as product-based, they may feel that English faculty without a specialist subject background are unqualified to teach its courses. When this happens, subject specialists have been asked to take over the running of ESP programs (Anthony, 2009), and sometimes they have even volunteered to teach classes in place of regular English faculty (see, for example, see Howell, 2009). This situation can arise even when the subject specialists have no training in language teaching themselves, which will be the most common case. The implication here, one must assume, is that knowledge about the field can take precedence over knowledge about language learning and teaching. In fact, growing dissatisfaction with

assumed 'unqualified' English faculty has also led some institutions to turn away from specialized ESP courses completely and focus instead on other skills, such as training their students to gain high scores on global English tests such as TOEIC or TOEFL (Anthony, 2009).

In this paper, I will argue that ESP practitioners can be effective in the classroom and that they have a vital role to play in the implementation of ESP programs even when they are not specialists in the target disciplines of their learners. In the rapidly changing world that we currently live in, the target *products* that learners require can vary dramatically and evolve rapidly over time, especially after the learners enter the workplace. Therefore, developing the product-oriented knowledge skills of a narrowly defined, highly specialized discipline will provide learners with few of the skills that they are likely to need in the real world. On the other hand, training learners in the *processes* of observation, recording, and analyzing texts will result in a set of skills that are much more regular and stable, and more importantly, highly valued in the modern workplace. These are exactly the same skills that ESP practitioners themselves use when developing effective traditional ESP courses. It follows that ESP practitioners are the most qualified people to teach learners these skills in an ESP classroom setting.

2. The changing view of subject specificity in ESP

When the history of ESP is reviewed, it becomes apparent that there have been several shifts towards and away from subject specificity. In the first stage of growth in the 1960s, ESP was largely seen as a product-based approach. Researchers tended to focus on specialized language registers in particular domains, such as electrical engineering, and show how the grammar and lexis of these registers differed from those of other disciplines, such as physics or biology, as well as general English (see Swales (1985) for a selection of articles from this period and Hutchinson & Waters (1987) for a critique of this work). This focus on subject specificity continued into the second stage of ESP development, which is perhaps signaled by the work of Lackstrom et al. (1973) on rhetorical and discourse analysis. However, in this period, although researchers were

still interested in the language of specialized disciplines, they began to look beyond the sentence to paragraphs and complete texts to see how the specialist disciplines influenced writing at these 'macro' levels.

A shift away from specialized disciplines can be seen in the third stage of ESP development that started in the late 1970s and continued through the 1980s and into the 1990s. During this period, researchers began to discuss whether it was necessary for an ESP teacher to have the same content knowledge as their target learners. Troike (1994: 7), for example, maintained that content knowledge was essential. Taylor (1994: 14), on the other hand, argued that the critical factors for an effective ESP class were not content knowledge but teacher attitude and interest. Researchers also began to consider the scientific principles on which the ESP approach itself was based. Scholars began looking more seriously at the differences between general and specific approaches to language teaching and found many overlaps and similarities (e.g., Stevens, 1971; Jordan & Mackay, 1973). This led to the proposal for 'wide-angled' approaches to ESP (in contrast to more traditional 'narrow-angled' approaches) that focused on 'core elements' of language that crossed subject specialization boundaries (Swales, 1990; Swales & Feak, 1994; Jordan, 1997). Others looked in detail at the target situational needs of learners and the processes by which the needs of learners could be ascertained (see Chambers, 1980). Finally, many researchers in this period began arguing that the value of ESP was not in its products at all, but as an approach to language *learning*. In their seminal work, Hutchinson & Waters (1987: 19) explain:

"... now there is a need for a wider view that focuses less on differences and more on what various specialisms have in common ... what they have in common is that they are all primarily concerned with communication and learning. ESP should properly be seen not as any particular language product but as an approach to language teaching and learning which is directed by specific and apparent reasons for learning."

Despite these strong words from Hutchinson & Waters (1987), by the end of the 1990s there had been a shift back towards a 'narrow-angled' product-based approach focused on specialized varieties of English rather than the learning process itself. For

example, in their seminal work *Developments in English for Specific Purposes* (1998), Dudley-Evans & St. John explicitly mention the strong relationship between ESP and specific disciplines in their definition of ESP (1998: 4-5). They also feel that working with subject specialists in the design and teaching of ESP courses is a necessity (1998:13). Although it is difficult to establish all the factors that resulted in this return to a narrow-angled approach, one clear influence was that of corpora. Corpus linguistics has been developing in line with ESP from the early 1960s. However, it was only in the mid-1990s that computers became cheap enough and powerful enough for ESP researchers to use them in their own studies of language use. Together with the introduction of easy-to-use concordance software, such as *WordSmith Tools* (Scott, 1996), researchers were in a much better position to analyze registers and identify interesting characteristic lexical and grammatical patterns in specialized fields. In addition, most corpus tools were (and still are) designed to work with a single corpus of texts, offering few methods to identify core elements across disciplines.

Appearing four years after Dudley-Evans & St. John's work, Hyland (2002) made a strong case for a return to specialized ESP. In his paper, Hyland explained that the move away from a wide-angled approach towards a narrow-angled, specialized ESP approach was valid for three important reasons. First, he argued that the starting point to recognizing literary practices in different fields should not be focusing on core elements, which he suggested were difficult to identify. Rather, he claimed that the starting point was to identify the *differences* between fields. He supported this by referring to research highlighting discipline and professional specific variation in terms of writing practices, surface textual features, and discourse characteristics. His view was also supported by traditional ESP studies, such as A. M. Johns' (1988), and corpusbased studies, such as Biber's (1988) work. Hyland concludes his argument with the following statement:

"... scholarly discourse is not uniform and monolithic, differentiated merely by specialist topics and vocabularies. It has to be seen as an outcome of a multitude of practices and strategies, where argument and engagement are crafted within specific communities that have different ideas about what is worth communicating,

how it can be communicated, what readers are likely to know, how they might be persuaded, and so on..." (p. 391)

Hyland's preference for a narrow-angled, discipline-specific ESP approach is clearly very much prevalent today. For example, Paltridge (2009) discusses the importance of language variation across disciplines quoting the work of Hyland (2002, 2004), Hyland and Bondi (2006), Biber (1992), and Lea (1996). Referring specifically to Hyland's 2002 work, Paltridge states that the use of language "cannot be divorced from the teaching of the subject itself" (pp. 291-292). The same view can also be found in the major journals of the field, such as the *English for Specific Purposes Journal*, and *Journal of English for Academic Purposes*, as well as more recent publications, such as the Taiwan International ESP Journal (TIESPJ). In these journals, prominence is given to studies looking at discipline variation across highly specialized fields and disciplines, as illustrated by the fact over half the papers in the *English for Specific Purposes Journal* in 2010 are related to this area.

On the other hand, this current trend for narrow-angled, subject-specific ESP places a great burden on ESP practitioners. If, as is often the case, they are not very familiar with the disciplines of the learners, they might be expected to take on the multiple roles of an ESP practitioner described by Dudley-Evans & St. John (1998). In this model, ESP practitioners are required to either research the characteristic patterns of the target discipline on their own, or collaborate with subject specialists. Then, they are expected to design courses and provide materials for the narrow-angled course. If commercial textbooks are not available, as would be the case for most narrow-angled fields, they will then be required to create materials or adapt existing ones, again perhaps with the help of subject specialists. Only after serving in these roles will the ESP practitioner be finally able to act in the more traditional role of teacher and evaluator. However, even here, the lack of specialist subject knowledge could be problematic and lead the teacher to seek further support from subject specialists inside the classroom.

Of course, the above description of a 21st century ESP practitioner is highly idealized. In reality, few practicing teachers have the time to research the narrow-

angled disciplines of their learners, especially as many ESP classes in academia, for example, are quite heterogeneous and comprise of learners from not one but multiple disciplines. The ability to work with subject specialists as research collaborators, materials providers, or team teachers, as suggested by Dudley-Evans & St. John (1998) and Master (2000), is also difficult in many institutions, where even working with people in the same department is a rarity. In addition, selecting or adapting ESP materials will pose problems for ESP practitioners, as publishers are required to make commercial successes of their ESP textbooks and will thus focus on broad topics that cover a wide-audience rather than focus on narrow-angled topics for learners of highly specialized disciplines.

Finally, the narrowly defined subject content of the course is also likely to increase difficulties, even when it is only serving as so-called 'carrier-content' (Dudley-Evans & St John, 1998:11). In narrow-angled ESP courses, the learners will most likely be more knowledgeable about the content than the teacher (Spack, 1988). As Belcher (2009: 11) describes, this is one of the most daunting aspects of the ESP approach for a teacher, and can lead to increased danger of teachers giving blatantly wrong feedback to learners, as described by Howe (1993). A focus on highly specialized content is also likely to exaggerate many of the difficulties faced by teachers at the attitudinal, conceptual, linguistic, methodological, and organizational level (Ewer, 1983).

If the above situation is an idealized case of ESP teaching, we then need to consider what is really happening in the ESP classroom. Although there is little research on this topic, my own experience of working in ESP in Asia suggests that one of two situations emerges. The first is that teachers who lack the tools and resources to investigate target disciplines begin to feel inadequate in the classroom and rely increasingly on published ESP textbooks, regardless of their appropriateness. Taking a hypothetical case, if the teacher is required to teach a course to physicists, he/she will endeavor to search for an ESP physics textbook, and on finding none available, will turn to the closest available textbook, which is likely to be one looking at more general science and engineering English. Although some publishers have attempted to create highly specialized ESP textbooks in key areas, such as chemistry and robotics, the

sheer number of more general ESP textbooks, such as those in science, engineering, and business, show that the narrow-angled approach is less commonly applied than research findings would suggest.

The second and more regrettable trend is that teachers will turn away from ESP altogether, marginalizing ESP teaching as something that only a select few teachers with extensive knowledge of the field can teach. Ultimately, this means that ESP teaching is left to the content specialists themselves. Evidence for this trend can be seen in the increased number of ESP courses introduced, managed, and taught by specialist subject faculty in Japan (see Fukui et al., 2009). In cases where institutions are unable to offer such narrow-angled ESP courses, sometimes the English program has been radically changed, offering mainly short-term courses intended to improve other perceived needs of learners, such as scores in national or international English proficiency tests, including TOEIC or TOEFL (Anthony, 2009). In essence, the institution choosing this option has still adopted an ESP approach, but has settled for one with a goal that it feels teachers can handle.

3. The case for a wide-angled approach to ESP

The conclusion to the previous section appears to be that ESP teachers either need to acquire a deep knowledge of the specialist field or give up on the ESP approach altogether. However, in this section, I will argue that this conclusion is based on a false premise: that a narrow-angled approach is the only way to proceed in ESP. On the contrary, I will argue that a wide-angled approach to ESP is often the only practical way to proceed. I will also show how it offers many advantages over the narrow-angled approach when dealing with discipline variation and adapting to the requirements of working in the 'new knowledge economy' (Dovey, 2006) of the 21st century.

3.1 Practical constraints in the development of ESP courses

The first reason to reject the narrow-angled approach to ESP is a purely practical one. Some areas of language usage are relatively easy to investigate; hence, we know

a great deal about them. One obvious example is that of research article writing, on which numerous papers have been written and published. It is not surprising, therefore, that many ESP courses focus on research article writing. However, we know much less about most areas of language usage due to difficulties involved with data collection, data processing, and interpretation of results. For example, despite 50 years of ESP research, we still know little about the language of scientific conferences including the varying expressions used to explain research in scientific presentations, turn-taking in question and answer sessions, and conference banquet dialogues. No doubt, attending conferences is a regular undertaking of any professional scientist or engineer, and there is a clear need for improved conference English skills among many non-native speakers of English. However, the lack of knowledge of this area means that it is very difficult to create a narrow-angled course in this area. Compounding the problem is the reality that ESP practitioners are increasingly being asked to teach more classes, attend more meetings, serve on more committees, go to more training sessions, and apply for more internal and external grants (Anthony, 2009). They simply do not have the time or resources to investigate a wide range of highly specialized subject areas.

A further practical issue relates to the institutions where ESP practitioners are likely to work. Many academic institutions do not prioritize ESP education, and thus, do not commit, nor want to commit, vast resources for language-specific enquiries such as those described above. Neither do institutions want to implement narrow-angled English courses for tens of faculties and possibly hundreds of departments. Adopting a narrow-angled approach might be possible if individual departments addressed their own language needs, as is starting to happen increasingly in Asia (see Section 2 above). However, suggesting that such an approach can be handled by ESP practitioners, with their limited time, funding, and resources, will only lead to more widespread abandoning of the approach or an acceleration of the trends described at the end of Section 2.

It is necessary, therefore, to consider an approach to ESP that is situated in the realities of a real-world educational institution. For many practitioners, this means an English department for which funding is limited, wide-scale materials development

projects are impractical, and research collaboration with subject specialists is infeasible. It also means a department where teaching is often carried out by part-time faculty who have responsibilities at more than one institution, each with a different set of teaching ideologies and practices.

Fortunately, there is one solution to this problem that has proved to be successful. As Anthony (2009) describes, the faculty of an English department can work together to develop a centralized, faculty- or institution-wide ESP program. This would allow faculty to share responsibilities for researching target areas, developing materials, applying for grants, gaining the understanding and support of management, and ultimately teaching and evaluating learners in the classroom.

3.2 Variability in specialist subject areas

The second reason to reject the narrow-angled approach to ESP is precisely that the language of specialist subject areas is highly variable. Hyland (2002), Paltridge (2009), and others are correct to point out the great degree of variation exhibited in specialized texts. However, for an ESP practitioner to teach anything at all, there must be some kind of stability in language forms and practices that can be capitalized on and relayed to learners. The suggestion to focus on narrow-angled specialist areas implies that there is stability at this level. For example, Hyland (2008) looks at the usage of lexical bundles across the four disciplines of electrical engineering, microbiology, business studies, and applied linguistics in an attempt to identify 'discipline-defining' common multi-word expressions. His results do show variation across these very broad groups, but his suggestion that these common multi-word expressions are 'disciplinedefining' is less clear. Indeed, there is a vast amount of research that shows that the subdisciplines of a field also exhibit large variations in language use (e.g., Anthony, 1999; Anthony, 2001; Bhatia, 2002; Bhatia, 2010; Orr, 1999). Therefore, what does it mean to talk about the usage of multi-word expressions in a field like electrical engineering or business studies? How applicable is that information to a learner who majors in a one of the eight major sub-branches of electrical engineering, such as power engineering, control engineering, or the massively broad area of computer engineering? If Hyland's study was repeated at the sub-discipline level, it can be anticipated that more variation would be found.

An additional problem with the Hyland study of 2008 is that is focuses on three presumably stable genres, i.e., research articles, master's theses, and doctoral theses. Other researchers such as Bhatia (1997), however, have reported on the existence of genre mixing, embedding, and blending. Paltridge (1999) goes further and reports on genre networks, sets, chains, and repertoires. Worse, Jordan (1997: 249) suggests that even distinguishing one discipline from another is not "clear cut." Therefore, the predictive power of such genre studies is far from clear.

A related point is that the differences between disciplines should more accurately be described as probabilistic variation in central core elements rather than deterministic rules (Halliday, 1991). This is supported by Paltridge (2009), who quotes Halliday's work directly, and also by Hyland (2002: 391) when he writes, "the ways that writers present their arguments, control their rhetorical personality, and engage their readers reflect *preferred* disciplinary practices" (emphasis added).

If we accept that there are common core features of language, it follows that there is clear value in identifying these features and relaying them to learners. It then becomes important to illustrate how these core features may vary across a range of disciplines, sub-disciplines, genres, and sub-genres so that learners can ascertain the relative stability of each feature, and assess the probability that the feature will appear in texts they are currently engaged with and those they may engage with later in their careers. In other words, the important skill that learners need to acquire is not the knowledge about how probable a certain feature is in a certain discipline, but rather, the ability to recognize, analyze, and/or estimate probabilistic variation in language features depending on the text encountered. Dovey (2006: 397) presents an almost identical view when she writes:

In the absence of a set of clearly defined genres, then, it seems most important to promote in students a metacognitive awareness of the way in which the structure of texts and linguistic strategies vary in relation to different audiences and purposes.

Fortunately, seasoned ESP practitioners with long experience of observing texts in various disciplines and sub-disciplines and identifying characteristic patterns of language usage within genres and sub-genres are in the ideal position to develop these skills in learners. Subject specialists, on the other hand, are likely to have a far narrower exposure to language variation and thus, will be less able to advise learners on the stability of linguistic features within and across disciplines.

3.3 Valued skills in the 'new knowledge economy'

The third and final reason discussed here for rejecting the narrow-angle approach to ESP is supported by the work of Dovey (2006), who builds on the work of Northedge (2003) to investigate the most valuable aspects of higher education that are transferable to workplace environments in today's 'new knowledge economy' (Dovey, 2006: 390).

Dovey (2006) explains that what counts as valuable knowledge in modern workplaces is changing dramatically (see also Northedge, 2003). Noting that companies are now placing increasing value on knowledge acquisition processes rather than knowledge itself, she argues that successful employees are those who can learn quickly and acquire new knowledge within constantly changing contexts. The growing view within companies is that learners need not spend all their years of education learning points of knowledge that may become obsolete even two or three years after they enter the workplace. Rather, they need to learn *how* to learn (Gee et al., 1996: 165). In addition, the ability to acquire new knowledge is closely linked to one's ability to work in a team on collaborative projects, communicating ideas through discussion, debate, and negotiation. As a result, the ability to communicate effectively is also becoming an increasingly important skill in the 'new knowledge economy.' Dovey argues that it is this skill of communication, in particular, that is one of the most important skills transferable from education.

The implications for ESP teaching and learning are clear. In a similar vein to the argument given in Section 3.2, Dovey (2006) shows that the ability to identify patterns of variation in core language concepts will be more useful to learners than a narrowly defined set of knowledge about a specialist discipline. Her study also points to a very

effective and useful way for learners to develop these skills. First, ESP practitioners should encourage learners to critically analyze both familiar and unfamiliar texts in a collaborative effort with other learners in the classroom. Here, they can practice discussing, debating, and negotiating the meaning and relevance of the linguistic features that they discover. The fact that ESP classrooms are generally heterogeneous would serve as an advantage rather than an inconvenience in such a context, as it would allow learners of mixed experiences, backgrounds, and disciplines to share and combine their knowledge to make new discoveries. Such an experience would also match closely the experiences learners would later encounter in the new knowledge economy of the workplace.

As stated above, none of these target skills or teaching approaches suggests that ESP practitioners should step aside and let subject specialists take over. On the contrary, the teacher-centered skills needed to manage a classroom environment where learners are involved in collaborative group and individual projects on varying topics, with different levels of experience, motivation levels, and interests will be familiar to many ESP practitioners. The same cannot be said for most subject specialists who will be more familiar with homogeneous classes of learners focusing on a single goal. For this group of teachers, such a learning environment is more likely to be viewed as something that is bordering on chaos.

4. Conclusions

In this paper, I have discussed whether ESP courses can or should be managed by non-specialist ESP practitioners. I have argued against the long-standing view that knowledge of the specialist field is an essential criterion for successful ESP practitioners. This view is largely derived from research results showing that language varies considerably across disciplines. Although these results are not contested, I propose that the large degree of variation within and across disciplines suggests that a more valuable skill to develop in learners is the ability to identify variation in texts, as well as estimate the stability of language features in and across disciplines and genres.

This view is also supported by the demands of modern workplaces, where the ability to acquire new knowledge is considered a more valuable skill than static knowledge of a certain phenomenon. I have also argued that a narrow-angled approach to ESP should be rejected simply on practical grounds in view of the limitations and constraints placed on ESP practitioners and the institutions in which they work.

Ironically, one way in which an effective 'wider-angled' approach to ESP can be adopted is by bringing corpus linguistics methodologies into the classroom, as proposed by Lee and Swales (2005) and Anthony (2011a), adopting a data-driven approach similar to that proposed by T. Johns (1994). In a classroom of learners from multiple disciplines, for example, each learner can be shown how to create a corpus from their own discipline, taught how to analyze their data (e.g., using a freeware concordance tool such as AntConc (Anthony, 2011b)), and then encouraged to compare their results with those of others to assess the stability of a certain feature across disciplines. In particular, understanding how to apply corpus tools will empower learners when facing new and varied texts later in their careers. They can also benefit from carrying out analyses as part of a group or individual language-focused project, which they choose, manage, and complete with only limited guidance and support from the teacher.

As the above example shows, the valuable skills that learners require in order to succeed in education and in their future careers do not need to be taught by subject specialists. On the contrary, subject specialists are unlikely to encounter great variation in the texts they are required to process, and thus, are likely to struggle if required to teach the above language analysis skills needed by learners. Also, they are unlikely to have experience of teaching in classroom environments that can foster these skills most effectively in learners, i.e., classrooms where learners of varying backgrounds, disciplines, and ability levels work together collaboratively to discover and enhance their understanding of language variation. On the other hand, seasoned ESP practitioners will have had great exposure to texts from varying disciplines and genres. They will also have had experience teaching in classrooms where learners work together in pairs and groups on their own projects, and without the need for direct support by teachers. Thus, they would be in an ideal position to teach the transferable

skills required by students in academic and workplaces situations, such as creating, analyzing, and comparing the results of corpora. In short, ESP practitioners are the best placed to teach ESP courses.

Notes

1. This is a substantially revised version of a paper presented at the Asia 2011 International Conference on English for Specific Purposes (ICESP, 2011), Taichung, Taiwan.

References

- Anthony, L. (1999). Writing research article introductions in software engineering: How accurate is a standard model? *IEEE Transactions. on Professional Communication*, 42(1), 36-46.
- Anthony, L. (2001). Characteristic features of research article titles in computer science. *IEEE Transactions on Professional Communication*, 44(3), 187-19.
- Anthony, L. (2009). ESP at the center of program design. In K. Fukui, J. Noguchi, and N. Watanabe (Eds.) *Towards ESP bilingualism* [in Japanese], (pp. 18-35). Osaka, Japan: Osaka University Press.
- Anthony, L. (2011a) Introducing Corpus-Based Methods into a Large-Scale Technical Writing Program for Scientists and Engineers. *Proceedings of the Corpus Linguistics Conference (CL 2011)*. July 20-22, 2011. Birmingham, UK.
- Anthony, L. (2011b). *AntConc* (Version 3.2.3) [Computer Software]. Tokyo, Japan: Waseda University. Available from http://www.antlab.sci.waseda.ac.jp/
- Barber, C.L. (1988). Some measurable characteristics of modern scientific prose. In J.M. Swales (Ed.) *Episodes in ESP* (pp. 1-16). Cambridge: Cambridge University Press.
- Belcher, D. (2009). What ESP is and can be: An introduction. In D. Belcher (Ed.), *English for specific purposes in theory and practice* (pp. 1-20). Ann Arbor, MN: University of Michigan Press.
- Bhatia, V. K. (1997). Genre-mixing in academic introductions. *English for Specific Purposes*, 16(3), 181–196.
- Bhatia, V. K. (2002). Applied genre analysis: A multi-perspective model. *Ibérica* 4, 3-19.
- Bhatia, V. K. (2010). Interdiscursivity in Professional Communication. *Discourse and Communication*, 21(1), 32-50.
- Biber, D. (1988). Variation across speech and writing. Cambridge, UK: Cambridge University Press.
- Biber, D. (1992) On the complexity of discourse complexity: A multidimensional analysis. Discourse

- Processes, 15, 133-163.
- Chambers, F. (1980). A re-evaluation of needs analysis. ESP Journal, 1(1), 25-33.
- Clapham, C. (2001). Discipline specificity and EAP. In J. Flowerdew and M. Peacock (Eds.), *Research* perspectives on English for academic purposes. Cambridge, UK: Cambridge University Press.
- Dovey, T. (2006). What purposes, specifically? Re-thinking purposes and specificity in the context of the 'new vocationalism', *English for Specific Purposes*, 25(4), 387-402.
- Dudley-Evans, T., & St John, M. J. (1998). *Developments in ESP: A multi-disciplinary approach*. Cambridge: Cambridge University Press.
- Ewer, J. R. (1983). Teacher training for EST: Problems and methods. ESP Journal, 2(1), 9-31.
- Fukui, K., Noguchi, J., and Watanabe N. (2009). (Eds.) *Towards ESP bilingualism* [in Japanese] (pp. 18-35). Osaka: Osaka University Press.
- Gee, J. P., Hull, G., & Lankshear, C. (1996). *The new work order behind the language of the new capitalism*. Sydney: Allen & Unwin.
- Halliday, M. A. K. (1991). Towards probabilistic interpretations. In E. Ventola (Ed.), *Functional and systemic linguistics: Approaches and uses* (pp. 36-61). Berlin: Mouton de Gruyter.
- Halliday, M. A. K., McIntosh, A., & Strevens, P. (1964). *The linguistic sciences and language teaching*. London: Longmans.
- Howe, P. M. (1993). Planning a pre-sessional course in English for academic legal purposes. In G. M. Blue (Ed.), *Language, learning and success: Studying through English* (pp. 148-157). London: Macmillan.
- Howell, F. S. (2009). English for science and engineering at Sophia University. In K. Fukui, J. Noguchi, and N. Watanabe (Eds.), *Towards ESP bilingualism* [in Japanese] (pp. 112-119). Osaka: Osaka University Press.
- Hutchinson, T., & Waters, A. (1987). *English for specific purposes: A learning-centred approach*. Cambridge, UK: Cambridge University Press.
- Hyland K., and Bondi, M. (Eds.). (2006). *Academic discourse across disciplines*. Bern, Switzerland: Peter Lang.
- Hyland, K. (2002). Specificity revisited: how far should we go now? *English for Specific Purposes*, 21(4), 385–395.
- Hyland, K. (2004) *Disciplinary discourses: Social interactions in academic writing*. Ann Arbor: University of Michigan Press.
- Hyland, K. (2008). As can be seen: Lexical bundles and disciplinary variation. *English for Specific Purposes*, *27(1)*, 4-21.
- Johns, A. M. (1988). The discourse communities dilemma: Identifying transferable skills for the academic milieu. *English for Specific Purposes*, 7(1), 55-59.
- Johns, T. (1994). From printout to handout: Grammar and vocabulary teaching in the context of

- data-driven learning, in T. Odlin (Ed.), *Perspectives on Pedagogical Grammar* (pp. 293-313). Cambridge: Cambridge University Press.
- Jordan, R (1997) *English for academic purposes: A guide and resource book for teachers*. Cambridge, UK: Cambridge University Press.
- Jordan, R. R. & Mackay, R. (1973). A Survey of the spoken English problems of overseas postgraduates at the Universities of Manchester and Newcastle. In *Journal of the Institute of Education 125*. Newcastle: University of Newcastle XXX.
- Lackstrom, J. E., Selinker, L., & Trimble, L. (1973). Technical rhetorical principles and grammatical choice. *TESOL Quarterly*, 7, 127-136.
- Lea, M. (1994). 'I thought I could write until I came here': Student writing in higher education. In G. Gibbs (Ed.), *Improving Student Learning: Theory and Practice* (pp. 216-226). Oxford, UK: Oxford Centre for Staff Development.
- Lee, D. & Swales, J. (2006). A corpus-based EAP course for NNS doctoral students: Moving from available specialized corpora to self-compiled corpora. *English for Specific Purposes*, 25, 56-75.
- Master, P. (2000). English and computers: A modified adjunct course. In P. Master, (Ed.), *Responses to ESP* (pp. 165-169). Washington DC: US State Department. 2000.
- Master, P. (2005). Research in English for Specific Purposes (2005). In Hinkel, E. (Ed.). *Handbook of research in second language teaching and learning* (pp. 99-116). Mahwah, NJ: Lawrence Erlbaum.
- Northedge, A. (2003). Rethinking teaching in the context of diversity. *Teaching in Higher Education*, 8(1), 17–32.
- Orr, T. (1999). Genre in the field of computer science and computer engineering. *IEEE Transactions*. on *Professional Communication*. Vol. 42(1), pp. 32-37.
- Paltridge, B. (2009). Afterword: Where have we come from and where are we now? In D. Belcher (Ed.), *English for specific purposes in theory and practice* (pp. 289–296). Ann Arbor, MI: University of Michigan Press.
- Scott, M. (1996). Wordsmith Tools 4. Oxford University Press.
- Spack, R. (1988). Initiating ESL students into the academic discourse community: How far should we go? *TESOL Quarterly*, 22(1) 29-51.
- Strevens, P. (1971). Alternatives to daffodils. In *Science and technology in a second language*. C.I.L.T. Report 7. London: Centre for Information on Language Teaching and Research, pp. 7-11.
- Swales, J. (1985). *Episodes in ESP : A source and reference book on the development of English for science and technology.* New York: Pergamon Institute of English.
- Swales, J. M. (1990). *Genre analysis: English in academic and research settings*. Cambridge, UK: Cambridge University Press.

- Swales, J. M., & Feak, C. B. (1994). Academic writing for graduate students: Essential tasks and skills. Ann Arbor, MI: University of Michigan Press.
- Taylor, M. (1994). How much content does the ESP instructor need to know? TESOL Matters, 4, 14.
- Terauchi H., Yamauchi, H., Noguchi, J. & Sasajima, S. (2010). (Eds.) *ESP in the 21st century* [in Japanese] Tokyo: Taishukan Press.
- Troike, R. (1994). The case for subject-matter training. TESOL Matters, 3, 6.
- * Corresponding author. 3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan, Faculty of Science and Engineering, Waseda University. anthony0122@gmail.com (Laurence Anthony)