Technical vocabulary in specialised texts

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Abstract

This article describes two studies of technical vocabulary, one using an anatomy text and the other an applied linguistics text. Technical vocabulary was found by rating the words in the texts on a four step scale. It was found that technical vocabulary made up a very substantial proportion of both the different words and the running words in the texts, with one in every three running words in the anatomy text, and one in every five in the applied linguistics text being a technical word. A considerable number of technical words were from the first 2000 words of English and the Academic Word List. The article ends with suggestions for helping learners notice and learn technical vocabulary.
Keywords: technical, vocabulary, academic words, specialised, terminology, terms, applied linguistics, anatomy

Introduction

There are several approaches taken to the identification of technical vocabulary. One approach is to use the intuition of a subject expert. This can be done in three ways, by using a rating scale as used in this study (Baker, 1988; Farrell, 1990), by using a technical dictionary compiled by a subject specialist or group of specialists (Nation, 2001: 201; Oh et al., 2000), and by making use of clues that the most relevant specialist, the actual writer of the text, used to mark the words considered to be important for the message of the text, since when new terms are introduced in a text, the writers deliberately provide contextual clues to help readers manage new terminology (Bramki and Williams, 1984; Flowerdew, 1992; Williams, 1981). Another way is to use a corpus-comparison approach by comparing word frequencies in a technical text with those in a different corpus (Becka, 1972; Yang, 1986; Baker, 1988; Farrell, 1990; Sutarsyah et al., 1994). Technical words should be much more frequent in the technical corpus.

Research on technical vocabulary (Sutarsyah, Nation and Kennedy, 1994; Chung, 2003; Chung and Nation, forthcoming) has shown a significant underestimation of the role played by technical vocabulary in specialised texts and a lack of information about how technical vocabulary relates to other types of vocabulary. This article reports on the significance of this research for language learners and teachers.

Vocabulary levels

One description of the various levels of vocabulary with the goal of designing the vocabulary component of a language course (Nation, 2001) divides vocabulary into four levels: high frequency words; academic vocabulary; technical vocabulary; and low frequency words. High frequency words are the most frequent 2,000 words of English. West (1953) called these words a general service vocabulary because they were of use (or service) no matter what the language was being used to do. This vocabulary typically covers around 80% of the running words of academic texts and newspapers, and around 90% of conversation and novels. It includes virtually all of the function words of English (around 176 word families), but by far the majority of high frequency words are content words (Nation, 2001: 13-16). For learners with academic goals, the 570 word family Academic Word List (Coxhead, 2000) is like a specialised extension of the high frequency words. It covers on average 8.5% of academic text, 4% of newspapers and less than 2% of the running words of novels. This vocabulary has been called academic vocabulary (Martin, 1976), sub-technical vocabulary (Cowan, 1974) or semi-technical vocabulary (Farrell, 1990). There has been a lot of discussion and some research on academic vocabulary (Nation and Coxhead, 2001). This vocabulary is common to a wide range of academic fields but is not what is known as high frequency vocabulary and is not technical in that it is not typically associated with just one field. It is however more closely related to high frequency vocabulary than to technical vocabulary. It was thought that the third level of vocabulary, technical words, covered about 5% of the running words in specialised texts, and was made up of words that occurred frequently in a specialised text or subject area but did not occur or were of very low frequency in other fields (Nation, 2001: 18-19). Technical vocabulary is largely of interest and use to people working in a specialised field. The fourth level of vocabulary consists of all the remaining words of English, the low frequency words. There are thousands of these words (Goulden, Nation and Read, 1990) and they typically cover around 5% of the running words in texts.

Technical vocabulary

While there is considerable research evidence about the nature and coverage of high frequency and academic words, there has been little investigation of technical vocabulary and low frequency words. One of the reasons for this is that there has been little agreement about what technical vocabulary is and about how to count it reliably. This article describes a study of the technical vocabulary in an anatomy text and the technical vocabulary in an applied linguistics text. It provides at least initial answers to the questions:

- How big is a technical vocabulary?
- What kinds of words make up a technical vocabulary?
- How important is technical vocabulary in specialised texts?
- How can learners be helped to cope with technical vocabulary?

Words were classified as being technical or non-technical words by rating them on a four point scale designed to measure the strength of the relationship of a word to a particular specialised

field. The scale used to do this is in Table 1, which has the scale for the anatomy vocabulary. The applied linguistics scale was essentially the same with different examples and suggested areas. Items classified at steps 3 and 4 were considered to be technical words. Items at steps 1 and 2 were not.

Table 1: A rating scale for finding technical words (as applied to the anatomy text)

Step 1
Words such as function words that have a meaning that has no particular relationship with the field of anatomy, that is, words independent of the subject matter. Examples are: *the, is, between, it, by, 12, adjacent, amounts, common, commonly, directly, constantly, early,* and *especially*.
Step 2
Words that have a meaning that is minimally related to the field of anatomy in that they describe the positions, movements, or features of the body. Examples are: *superior, part, forms, pairs, structures, surrounds, supports, associated, lodges, protects*.
Step 3
Words that have a meaning that is closely related to the field of anatomy. They refer to parts, structures or functions of the body, such as the regions of the body and systems of the body. Such words are also used in general language. The words may have some restrictions of usage depending on the subject field. Examples are: *chest, trunk, neck, abdomen, ribs, breast, cage, cavity, shoulder, girdle, skin, muscles, wall, heart, lungs, organs, liver*, *bony, abdominal, breathing*. Words in this category may be technical terms in a specific field like anatomy and yet may occur with the same meaning in other fields and not be technical terms in those fields.
Step 4
Words that have a meaning specific to the field of anatomy and are not likely to be known in general language. They refer to structures and functions of the body. These words have clear restrictions of usage depending on the subject field. Examples are: *thorax, sternum, costal, vertebrae, pectoral, fascia, trachea, mammary, periosteum, hematopoietic, pectoralis, viscera, intervertebral, demifacets, pedicle.*

Words at Step 3 may have polysemes that occur in general use, and in some cases occur in general use with little change in meaning, for example *breathe* and *bony*. Step 4 includes words like *thorax* and *mammary* which may be known in other fields but which have a technical flavour. Even though they are used outside anatomy they could be thought of as being anatomical terms.

The inter-rater reliability check

To make sure that the scale could be applied consistently by other researchers and was applied consistently in the present research, an inter-rater reliability check was carried out. The raters' task in the inter-rater reliability check was to assess the degree of specificity of the meaning of the words in the text to the field of anatomy.   Sixty words (fifteen from each of the four steps)

were randomly chosen to be used from one section of the text. The researcher had already classified these items using the scale.

The rater in the main inter-rater reliability check was also a qualified and experienced ESOL teacher who is a native speaker of English. The rater's task was to assign the test words to the four steps of the scale depending on the degree of relationship of the meaning to the field of anatomy.

The researcher explained the objectives of the study, the aim of the reliability check, and how to consider the semantic relationship in order to place the words in the four-point scale. At the training stage, the rater was provided with the text in which the words to be rated were already marked. Forty words (ten from each of the four steps as classified by the researcher) were randomly chosen to be used. The researcher and the rater went through the words one by one together. Each time the rater's results were compared with those of the researcher. When discrepancies were found, they were discussed by the researcher and the rater, and all were resolved. The training session took about 35 minutes.

Then, sixty randomly selected words, fifteen from each of the four steps, were provided for the rater to analyze independently. The rater used the same text as the one used at the training stage, but with different words marked. This number of words (15) at each step is much greater than the minimum of three needed to establish rating accuracy from four groups at the 0.05 level of significance (Rosenthal, 1987: 64).

The reliability accuracy score was used to estimate the degree of agreement between the researcher's results and the rater's. The degree of agreement of rating at each step of the rating scale was compared to find any tendencies of bias at particular steps. Rosenthal (1987: 67) states that a raw accuracy score of 0.7 is desirable for rating items in four groups.

Table 2: Inter-rater reliability accuracy score calculated by the number of words assigned to the four steps by the rater and by the researcher

Steps chosen by the rater	Steps chosen by the researcher				Total words assigned by the rater
	1	2	3	4	
1	**13**				13
2	2	**14**			16
3			**15**		15
4		1		**15**	16
Total words assigned by the researcher	15	15	15	15	**Accuracy score** **=(13+14+15+15)÷60** **= 0.95**

In Table 2 above, we see that of the 15 words assigned to each of the four steps by the researcher, the rater agreed on the assignment of 13 items out of 15 at Step 1 and 14 out of 15 words at Step 2. At Steps 3 and 4, the rater agreed on the assignment of all 15 of these items. Thus, the total agreement score is (13+14+15+15=) 57 out of 60.

The total scores 16 in the second row and the fourth row of the last column of Table 2 indicate that the rater has a slight bias for rating words towards the more technical end of the scale. Since a raw accuracy score of 0.7 is acceptable, this result of 0.95 accuracy is very satisfactory. Clearly, the scale can be applied consistently and others can learn how to use it consistently.

How big is a technical vocabulary?

The texts chosen for analysis were *Clinically Oriented Anatomy* (Moore and Dalley, 1999, 4th edition) and *Learning a Second Language through Interaction* (Ellis, 1999). They were chosen because the first author has tertiary qualifications in nursing and applied linguistics and could thus bring specialist knowledge to bear on the classification of the words. The texts were of different lengths and were probably intended for different kinds of audiences -- the anatomy text being largely intended for those new to the field while the applied linguistics text may have been intended for those who already have some knowledge of applied linguistics. These differences undoubtedly affected the results. However, the primary purpose of the research was to see if technical vocabulary could be reliably distinguished from other vocabulary, and to gain some indication of the size and density of technical vocabularies. Table 3 contains the data about the size and various levels of the vocabulary in the two texts. The unit of counting is the word type. The counting of word types (Table 3) and tokens (Table 4) was done by a computer program called RANGE which is available free at http://www.vuw.ac.nz/lals/staff/paul_nation/index.html. Word types, rather than word families, were used as the unit of counting because it was found that just because one or two members of a family were technical words, not all of them were (e.g., *frequency* and *frequent*). A word type is a single word form, such as *agree* or *agrees*. When types are counted, *agree* and *agrees* are counted as different types. A word family, on the other hand, includes a collection of formally related and semantically related word types. So, the *agree* family could include *agree, agrees, agreed, agreeing, agreement, disagree, disagreement* (Bauer and Nation, 1993).

Table 3: Types of vocabulary in two specialised texts

Vocabulary level	Anatomy	Applied Linguistics
1st 2000	2,311 (20.3%)	2,149 (41.8%)
AWL	974 (8.6%)	894 (17.4%)
Technical words	4,270 (37.6%)	835 (16.3%)
Low frequency words	3,801 (33.5%)	1,259 (24.5%)
Total types	11,356 (100%)	5,137 (100%)

The figures exclude the preface, acknowledgements, table of contents, and bibliography. Anatomy clearly has a large technical vocabulary -- 4,270 word types making up 37.6% of the total word types. The applied linguistics text is much shorter than the anatomy text (see Table 4, 93,445 tokens compared with 452,192 tokens), and its 835 technical word types make up a much smaller proportion (16.3%) of the total word types. This is not an effect of text length but of the less specialised and more generally accessible nature of applied linguistics.

What kinds of words make up a technical vocabulary?

Let us look at some examples of the technical vocabulary from each of the texts. Word types at step 3 on the scale in the anatomy text include *canal, disease, clinical*, and *pulse*, and at step 4, *laminae, xiphoid, spinous,* and *subcostal.* In the anatomy text, 35.6% of the technical vocabulary is at step 3 on the scale, while the majority, 64.4%, is at step 4. Words from step 3 on the scale in the applied linguistics text include *instruct, interrogatives, paraphrase,* and *glossing*, and at step 4 *hyponomy, morphosyntax, lexicon* and *polysyllabic*. A rather large percentage, 88.4% of the technical vocabulary in the applied linguistics text is at step 3 on the scale, while a much smaller proportion, 11.6%, is at step 4.

It should be clear from these examples that some technical words are common in ordinary English. Technical words at step 3 of the scale can come from the high frequency words or the Academic Word List. In the anatomy text 16.3% of the word types at step 3 were from the GSL or AWL. No words from step 4 were. In the applied linguistics text, 50.5% of the words at step 3 were from the GSL or AWL. Applied linguistics clearly uses an accessible vocabulary -- 6.2% of the words at step 4 on the rating scale (Table 1) were from the GSL or AWL. The figures given in Tables 3 and 4 have had this technical vocabulary removed from them. For example, the 2000 high frequency words of English cover 77.7% of the tokens or running words in the applied linguistics text. But 11.9% of these words are actually high frequency words that are closely related to the field of applied linguistics, most of which are at step 3 of the rating scale. Similarly, the AWL covers 13.1% of the applied linguistics text, but 47.3% of these tokens are technical words in applied linguistics. The same is true to a much lesser extent in anatomy, and has been noted in other studies. For example, words like *cost, demand, price, supply* are common technical terms in economics (Sutarsyah, Kennedy and Nation, 1994). Words like *circuit, field, energy,* and *plate* are common technical words in electronics (Farrell, 1990).

Clearly, there is a striking difference between anatomy and applied linguistics not only in the amount of technical vocabulary but also in the nature of that vocabulary. Anatomy has a much larger technical vocabulary (4,270 different words in Table 3) and when that vocabulary was rated on the scale in Table 1 it was found that two-thirds of that technical vocabulary (64.4%) is made up of word forms that are largely restricted to the field of anatomy. Applied linguistics has a smaller technical vocabulary and most of that vocabulary (88.4%) is made up of words that are largely familiar to people with no specialist knowledge of the field.

How important is technical vocabulary in specialised texts?

We have looked at how large a technical vocabulary might be and the kinds of words that it can consist of. Let us now look at how often these words occur in specialised texts. The unit of counting is the token. The previous sentence contains seven tokens and six types. The word type *the* occurs twice (has two tokens) in the sentence. Thus in Table 4 the first 2000 word families account for 239,790 tokens in the anatomy text and 63, 992 tokens in the applied linguistics text.

Table 4: Coverage of the texts by the various levels of vocabulary tokens (% coverage)

	Tokens in the anatomy text	Tokens in the applied linguistics text
1st 2000 words	239,790 (53.3%)	63,992 (68.5%)
Academic Word List	16,554 (3.7%)	6,442 (6.9%)
Technical words	140,400 (31.2%)	19,208 (20.6%)
Low frequency words	53,256 (11.8%)	3,803 (4.0%)
	450,000 (100%)	93,445 (100%)

Table 4 shows that the 2000 word family *General Service List* (West, 1953) which has had technical terms in anatomy removed (for example, *neck, arm, stomach*) accounts for 239,790 of the 450,000 running words in the anatomy text which is 53.3% of the total tokens. The most striking figure is the 31.2% coverage by technical terms. Almost one out of every three words in the anatomy text (31.2%) is a technical term. The sample of marked anatomy text in Figure 1 shows this.

Figure 1: A sample of the anatomy text showing the various kinds of words (Moore and Dalley, 1999: 60)

The *thorax* (chest) is the *superior* part of the trunk between the neck and the *abdomen*. It is formed by the 12 pairs of *ribs*, *sternum* (*breast* bone) *costal cartilages*, and 12 *thoracic vertebrae* (*Fig*. 1.1). These bony and *cartilaginous* **structures** form the *thoracic* cage (*rib* cage), which surrounds the *thoracic cavity* and supports the *pectoral* (shoulder) *girdle*. Along with the skin and associated *fascia* and *muscles*, the *thoracic* cage forms the *thoracic* (chest) wall, which *lodges* and protects the contents of the *thoracic cavity* -- the heart and lungs, for example -- as well as some *abdominal* organs such as the *liver* and spleen. The *thoracic* cage provides **attachments** for *muscles* of the neck, *thorax*, upper limbs, *abdomen*, and back. The *muscles* of the *thorax* itself *elevate* and **depress** the *thoracic* cage during breathing. Because the most important **structures** in the *thorax* -- the heart, *trachea*, lungs, great vessels, and the *thoracic* wall itself -- are **constantly** moving, the *thorax* is one of the most **dynamic regions** of the body.

Thoracic Wall
The *thoracic* cage is covered by skin, *fascia*, and *muscles*, including those **attaching** the *pectoral girdle* to the upper limb and trunk. The *mammary glands* of the *breasts* (L. *mammae*) are in the *subcutaneous tissue*. The **function** of the *thoracic* wall is to not only protect the contents of the *thoracic cavity* but also provide the mechanical **function** of breathing. With each breath, the *muscles* of the *thoracic* wall working in *concert* with the *diaphragm* and *muscles* of the *abdominal* wall **vary** the **volume** of the *thoracic cavity*, first by **expanding** the **capacity** of the *cavity*, **thereby** allowing the lungs to **expand**, and then, mostly through their **relaxation**, decreasing the **volume** of the *cavity*, causing the lungs to *expel* air.

The first 2000 high frequency words are unmarked, words in the AWL are in **bold**, low frequency words, i.e., not in the first 2000 high frequency words or AWL are in *italics*, technical terms are underlined. So *chest* in line 1 is a technical word from the first 2,000 words of English.

In addition to this quite a large proportion of the running words (11.8%) consists of low frequency words. The picture is somewhat different in the applied linguistics text, but the technical terms still account for quite a large proportion of the text (20.6%) -- one word in every five. Figure 2 is a marked sample of the applied linguistics text.

Figure 2: A sample of the applied linguistics text showing the various kinds of words (Ellis, 1999: 1)

This book explores the relationship between **interaction** and second <u>language (*L2*)</u> **acquisition**. It addresses three general questions:

1. In what ways does **interaction**/ **input contribute** to *L2* **acquisition**?
2. Which types of **interaction**/ **input** promote *L2* **acquisition**?
3. What kind of <u>language *pedagogy*</u> is needed to **ensure** that *classroom* <u>learners </u>experience **acquisition** - rich **interaction**?

These questions are addressed both in **chapters** that <u>review </u>**interactionist theories** of *L2* **acquisition** and in those that report **specific research** <u>studies</u>. The **chapter** in this introductory **section** provides a general <u>review</u> of **interactionist theories.**

It is useful to distinguish two different but related <u>meanings </u>of ' **interaction** '. First, **interaction** can be viewed as the social behaviour that **occurs** when one person **communicates** with another. **Interaction** in this sense is *interpersonal*. It can **occur** face-to-face, in which case it usually takes place through the <u>*oral*</u> **medium**, or it can **occur** as **displaced** activity, in which case it generally **involves** the <u>written</u> **medium**. In some sense, <u>*oral* *interpersonal*</u> **interaction** is basic to human **communication**, as all **communities**, whether <u>*literate*</u> or not, *engage* in it. Also, it **constitutes** the **primary** purpose for our *species* -- **specific** <u>language </u>**capacity** and the means by which it has developed both <u>*phylogenetically*</u> and <u>*ontogenetically*</u>. This book will concern itself mainly with <u>*oral*</u> **interaction** of the <u>*interpersonal*</u> kind.

Second, **interaction** can **occur** inside our minds, both when we *engage* in the kind of <u>'private speech'</u> discussed by *Vygotsky* (1978), and, more *covertly*, when different *modules* of the mind **interact** to **construct** an understanding of or a **response** to some **phenomenon**. In <u>reading</u>, for example, we draw **interactively** on our ability to <u>*decode*</u> print, our stored <u>knowledge </u>of the <u>language </u>we are <u>reading </u>and the <u>content *schemata*</u> through which our <u>knowledge </u>of the world is organized. **Interaction** of this kind, then, is <u>*intrapersonal*</u>. This book will also consider <u>*intrapersonal*</u> **interaction** and its relation to second <u>language (*L2*)</u>learning.

The low frequency words make up only a small proportion of the words in the applied linguistics text (4%) and among other words include foreign words used in examples, examples of language errors, and names used in references to research.

In both texts, technical words make up a very large proportion of the running text -- much larger than the 5% suggested in Nation (2001: 12). These technical words are less noticeable in the applied linguistics text because a large proportion of them are words from the high frequency list and the AWL which can be technical words in applied linguistics. Nation's estimates were not based on data and were the best guesses from what was left after high frequency, academic, and low frequency vocabulary was counted. At the time there was no reliable way of distinguishing technical words.

How can learners be helped to cope with technical vocabulary?

The rating scale used in this study distinguishes two kinds of technical words -- those that may occur in general non-specialised usage, and those that are largely unique to a particular specialised field. These two kinds of technical words pose different kinds of problems for learners in recognising that a word is a technical word, and in learning technical words.

Recognising technical words

The most obvious technical words are those which have Greek or Latin based forms and which do not occur outside of the specialised area. In the applied linguistics text, these included words like *multicolinearity*, *interlingual*, *connotative*, and *BICS*, and in the anatomy text, words like *perichondrium*, *ramus*, *synchondrosis*, and *viscera*. In a separate part of a larger study that this article is drawn from, it was found that for over half of the different technical words in the anatomy text, the writers provided clues that the word was special in some way (Chung and Nation, forthcoming). These clues included (1) the word being defined in the text (what Bramki and Williams call lexical familiarisation), (2) the word being written in bold or italics, (3) the word appearing as a label in a diagram. Readers need to be familiar with these clues. Definitions can take a very large variety of forms (Bramki and Williams, 1984; Flowerdew, 1992), and some of these may be difficult to notice.

Here are some definitions from the anatomy text and the applied linguistics text.

- *The thorax is the superior part of the trunk between the neck and the abdomen.*

- *The surgical creation of an anterior opening into the thoracic wall is an anterior thoracotomy.*

- *Ribs (L. costae) are curved, flat bones that form most of the thoracic cage.*

- *Ischemic muscle pain in the upper limb (pain resulting from poor blood supply to the limb muscles)*

- *It is useful to distinguish two different but related meanings of 'interaction'. First, interaction can be viewed as the social behaviour that occurs when one person communicates with another.*

- *These exchanges involve what Long (1980) has called **interactional modifications** (i.e., changes to the structure of a conversation to accommodate potential or actual problems of understanding).*

- *Thereby supplying them with **positive evidence** (i.e., 'models of what is grammatical and acceptable' -- Long 1996; 413).*

The presence of such definitions is a very strong clue that the word is technical. Recognizing such definitions is particularly important where a common word is used in a specialized way with a restricted meaning, for example *negotiation* or *input* in applied linguistics. The definition signals that this known word is now being used with a restricted meaning. Definitions may be accompanied by some typographical marking (using bold or italics as in the examples below) of the technical term being defined.

- *The **xiphoid process** -- the smallest and most variable part of the sternum -- is thin and elongated.*

- *In young people, four <u>sternebrae</u> -- primordial segments of the sternum -- are obvious.*

Repetition also provides a clue that a word may be technical. Technical vocabulary typically occurs much more frequently in a specialized text than in general usage. When a word is used often, learners should check if it has a restricted meaning in that subject area.

Learning technical words

Whenever a word is met and it is used in a way which is different from previously met uses, it is worthwhile for the teacher to draw attention to the way that this particular use relates to other uses of the word. Where technical terms are extensions of words in general use, it is useful for learners to see how the technical sense of the words relates to the core meaning of the word, as in *girdle* and *cavity*

>   *supports the pectoral <u>girdle</u>*

>   *the contents of the thoracic <u>cavity</u>*

This is most easily done by getting the learners to look at all the senses of the word in a dictionary and see what core meaning they have in common. Ruhl (1989) would see this as an application of the "monosemic principle", that is that it is always good to assume that formally related words have related meanings. For example the entry for *girdle* in the Collins English Dictionary (Hanks, 1984) has the following senses:

- A woman's elastic corset
- Anything that surrounds or encircles
- A belt or sash
- The outer edge of a gem
- Any encircling structure or part (*Anatomy*)
- The mark left on a tree after the removal of a ring of bark
- To surround or encircle

The core meaning in this example is the second item in the entry and can be found in all the other senses listed. There are other activities which encourage learners to relate senses of words to each other (Visser, 1989). The value of seeing how particular uses relate to a core meaning is that it makes later meetings with the word easier to understand, and brings under one concept items that may be represented by different concepts in the first language.

It is also useful to note if the technical use of the word involves a collocation or a grammatical form that differs from its other uses. Most technical vocabulary needs to be learned productively by learners specializing in that area and learning common collocations and grammatical patterns helps this.

Words which are based on Greek or Latin roots should be analyzed where possible and the meanings of the word parts should be related to the meaning of the word. This can be done by the teacher, but it is also a strategy that learners can work on (Anglin, 1993). In the anatomy text there are affixes which are useful in anatomy and these are worth learning.

There are two major problems for teachers in helping learners deal with technical vocabulary. Firstly, the English teacher does not usually have specialist knowledge of the learners' technical areas. Secondly, technical vocabulary needs to be worked on while getting on top of the specialized field. However, in spite of these limitations, teachers can play a small but useful role in preparing learners for coping with technical vocabulary. This can be done by helping learners gain the more general skills of recognizing technical words, interpreting definitions, relating senses to a core meaning, and learning word parts. Teachers can provide learners with the tools for dealing with technical words. In this way teachers need not get involved in trying to teach in a technical area, but can direct their attention to vocabulary strategies.

This research has used a scale especially developed for the study to examine the nature and amount of technical vocabulary in two quite different technical texts. The study shows that while some subject areas are likely to have very heavy technical vocabulary loads, a significant amount of this vocabulary is not necessarily new for beginners in the field. This is largely because some technical words are used outside the technical area with much the same if not identical meanings. Moreover, some words which are typically high frequency words or academic words can function as technical words in certain fields (Flowerdew, 1993). Technical vocabularies can be large, and they can also account for a very large proportion of the running words or tokens in a text. The present piece of research has looked at two texts to examine something of the nature of technical vocabulary. A much larger, representative corpus of a technical field would be needed to come near to listing a definitive technical vocabulary for that field.

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