Vocabulary in English for academic purposes (EAP) is a rich and fast moving area of
endeavour, which is growing rapidly beyond the historical areas of English as a first language
contexts such as the USA, UK, Canada, Australia, and New Zealand, to English as a second
or foreign language contexts (Evans & Morrison 2011), including Spain, Turkey, Taiwan, and
China, for example. Acquiring academic and disciplinary vocabulary is an important task of
both first and second language learners of EAP. This task involves learning to recognise and
use vocabulary that is closely tied to the content of a particular field of study. Woodward-Kron
(2008: 246) points out the close relationship between a student’s disciplinary knowledge and
the specialised language of the discipline. However, as Flowerdew (2014: 6) states, there is
a major gap in the EAP literature, in particular of studies that ‘go beyond simple frequency
counts and also consider learnability and teachability’.

Academic vocabulary has been classified in many ways in the literature over the last
decades. It has been divided into English for general academic purposes (EGAP) and English
for specific academic purposes (ESAP). Academic vocabulary can be seen as a layer of
vocabulary that occurs across a range of academic subject areas, meaning students would
encounter this vocabulary in biology or chemistry, linguistics or law. There is argument
about whether there is a core of academic vocabulary (see Hyland & Tse 2007), for example,
because occurrence of words in a particular area does not necessarily mean that these items
are used in the same way or with precisely the same meaning in different subject areas.

Disciplinary vocabulary is, in some ways, somewhat easier to define than academic
vocabulary. One element of definition of disciplinary vocabulary is that it has a narrow range
of occurrence within a particular subject area. That is, it occurs in texts in particular subject
areas but does not tend to occur outside those texts. The frequency of disciplinary lexical
items in texts is also important to the definition. If items are shared with other discipline
areas, higher frequency of occurrence in a particular discipline can be seen as a marker of
disciplinarity (Chung & Nation 2004).

Disciplinary vocabulary is often referred to as specialised, technical, semi-technical,
or sub-technical. These terms at times signify differences in definitions of what can be
considered discipline-specific vocabulary. For example, Mudraya (2006: 242) defines ‘sub-technical vocabulary’ as lexical items that have both non-technical and technical senses in engineering. In EAP studies, disciplinary vocabulary refers to particular subject areas within a university. Hyland (2008), for example, analysed lexical bundles in professional and student writing in four disciplines: electrical engineering, biology, business studies, and applied linguistics.

At times, disciplinarity might seem quite clear cut, as in the case of words such as photosynthesis, but other examples suggest difficulties with definitions, for example with lexical items such as clinical (compare clinical trials with a clinical decision), and proper nouns such as Parkinson or Parkinson’s where the family name of a researcher becomes the name of a disease or a medical condition. Interestingly, the number of proper nouns can vary in texts, depending on the discipline. For example, in a US-based middle school social studies and history corpus, proper nouns make up almost 6 per cent of texts (Greene & Coxhead 2015), and includes words such as Gettysburg which is both a place name and a major historical event.

Chung and Nation (2004: 104), in an investigation of methodological approaches to identifying technical vocabulary, point out that there had been few studies of technical vocabulary in texts. The authors suggest that this gap is because the field suffered from a lack of agreement on the nature of this vocabulary and how it could be reliably counted. Early estimates posited about 5 per cent of a text, or roughly 1,000 words or fewer, in a subject area would be technical in nature (Coxhead & Nation 2001: 252). However, more recent work suggests that even larger percentages of academic texts might be technical. Chung and Nation (2003) identified 30 per cent of an anatomy text and 20 per cent of an applied linguistics text as technical vocabulary.

Academic and professional studies tend to be high-stakes environments for learners. Being able to use and understand specialised vocabulary can signal membership of an academic or professional field (Wray 2002). For language learning in general, Milton (2009: 64) argues that, ‘building a large vocabulary of several thousand words appears to be an absolute condition of being able to function well in a foreign language’, and that 3,000 words or more are needed by learners ‘to approach full comprehension’ of the texts they are reading. Because of the large number of lexical items that students need in order to deal with their academic studies in English, research into this field can support learners and teachers in making decisions on where to put their efforts and time, both in class and for independent study. These decisions are usually driven by the needs of the learners.

What is the vocabulary learning burden of academic texts?

Recent research has drawn on the concept of the ‘vocabulary load’ of academic texts. That is, how many word families are there in a text? A word family means the inflections and derivations of a word. For example, the word family for invest would include invests, invested, investing, investment, investments, reinvest, and so on. The vocabulary load of a text can be determined by the percentage of coverage of a text using word lists. Nation (2006) found that 98 per cent coverage of academic written texts is reached at 8,000–9,000 word families, using his word lists based on the British National Corpus (BNC). Recent work by Hsu (2011) looks into the vocabulary thresholds of textbooks and research articles for business students, while Hsu (2014) considered the vocabulary load of engineering textbooks in Taiwan. Vocabulary load analyses can be extremely enlightening about texts used in classrooms. Coxhead, Stevens and Tinkle (2010) found that the vocabulary load of a science textbook used in the final year of secondary school education in New Zealand was over 20,000 word
families. It is quite unlikely that any student (native or non-native English speaker) reading
that text would have a vocabulary size knowledge of over 16,000 word families (Coxhead,
Nation & Sim 2015).

More specialised academic texts tend to need more word families to reach 98 per cent, as
evidenced by a study from Radford (2013), who compared the vocabulary load of academic
journals in computer science in the 1950s with journals in computer science in the 2000s.
Radford counted proper nouns in the texts separately (see above). He found that 9,000 word
families from the BNC covered 86.41 per cent of his approximately 2,290,000 corpus of
journal articles, with proper nouns covering 2.94 per cent of the corpus. Radford (2013) also
noted that from the 1950s to the 2000s, articles have almost doubled in length and around
one-third more word families were used in the 2000s than in the 1950s. Radford’s study
suggests that there are items outside the first 20,000 word families that might be specific to
computer science, but much more research needs to be done in this field as in other areas
of specialisation. This study goes some way towards documenting lexical change in a rapidly
growing and specialising academic field.

The gap between what vocabulary learners need to know to understand their academic
texts and lectures in English is highlighted starkly in a study by Ward (2009a). Ward tested
the vocabulary knowledge of undergraduate engineering students in Thailand, using the
first 2,000 words of Michael West’s (1953) General Service List (GSL) (West 1953) and
Ward’s own (1999) 2,000 word Engineering Word List (EWL). Ward (2009a) found that the
vocabulary knowledge of the approximately 250 learners in his study represented roughly
half the GSL and less than half the items on the EWL. Ward makes a strong case for teaching
in his context to be much more focussed to better serve the needs of these learners. Another
demonstration of the importance of vocabulary in university context is Harrington and
Roche’s (2014) use of the measurement of vocabulary knowledge (in this case, vocabulary
size, and speed of response) as a way to identify at-risk students in an English-as-a-medium-
of-instruction university in Oman.

Reading, writing, vocabulary, and EAP

Reading for academic purposes in the course of university study can involve exposure to
several million running words each year. The nature of the words encountered while reading
is a fundamental topic of research into academic and disciplinary language. An example of this
research is work done by Miller (2010), whose US-based study analysed the percentage of the
Academic Word List (AWL) (Coxhead 2000), as well as readability/complexity and syntactic
features of the texts in two corpora: university textbooks and English as a second language
(ESL) reading books. The textbook corpus contained six disciplines: business, humanities,
natural science, social science, education, and engineering. In the AWL comparison, the
researcher found that roughly half as many AWL items were in the ESL reading materials as
were in the university level texts, which Miller (2010) points out means that on an average
page of 400 words, an ESL textbook would contain approximately 15 fewer AWL items per
page than a university textbook. The researcher comments,

It is possible, then, that the ESL textbooks are providing students neither the
exposure to the range of academic vocabulary nor the number of encounters with
academic vocabulary that they may need to develop successful comprehension of
university textbooks.

(Miller 2010:39)
Vocabulary is also important for writing for EAP, particularly as writing is the most prevalent form of assessment at tertiary level. Storch and Tapper (2009) investigate how an EAP course impacts on academic vocabulary use in postgraduate writing at an Australian university. They find evidence of increased usage of academic vocabulary items (from Coxhead’s 2000 AWL) and appropriate use of those items by the participants in their writing. The authors suggest that various aspects of the course might have supported students’ development of academic vocabulary, including reading in specialised subject areas, a direct focus on academic vocabulary through teaching, feedback on writing, and discussions during the course. In a New Zealand study of the use of vocabulary in writing by EAP students, Coxhead (2012) examined essays and reading texts together with student interviews to find out more about the decisions these writers made on vocabulary use in their writing. She found a range of factors that affected vocabulary use in writing, including the academic audience for student writing, the beliefs of the writers themselves about academic and discipline specific vocabulary, their risk-taking behaviours, and how sure the writers felt about their vocabulary knowledge.

**Critical issues and topics**

Three topics will be discussed in this section, focussing on the acquisition of academic and discipline-specific vocabulary. These topics are: identifying this vocabulary; high frequency words with specific meanings in academic or discipline specific texts; and multi-word units and metaphor in academic texts.

**Identifying and categorising academic and disciplinary vocabulary**

Identifying and categorising academic and disciplinary vocabulary for EAP is important for setting learning goals, checking progress, and helping tomorrow’s language learning today. Word list research has gained momentum as corpus linguistic techniques and tools have been developed and made readily available. Early research on word lists for academic purposes include Xue and Nation’s (1984) University Word List, which was an amalgamation of four existing word lists. Coxhead’s (2000) Academic Word List used a corpus-based approach to identify 570 word families that occur outside the first 2,000 words of West’s (1953) GSL, and across 28 subject areas in four academic disciplines. See Coxhead (2011a) for an overview of the AWL. Other specialised word lists which have used similar methodological approaches to the AWL but in different academic subject areas are, for example, Martínez, Beck and Panza’s (2009) examination of academic vocabulary in agriculture, and Coxhead & Hirsh’s (2007) Science Word List for EAP (see Coxhead 2011a for more examples). Other lists, such as Ward’s (2009b) Engineering English word list for lower proficiency undergraduates, were based on the materials that a particular group of learners have to read in the course of their studies, thereby targeting the development of a very particular set of lexical items.

With the advent of larger corpora has come more word list research, including Gardner and Davies’ (2013) new academic vocabulary list, based on the 120-million-word academic subsection of the Corpus of Contemporary American English (COCA) corpus. The website for this corpus is particularly useful for investigating words in use. Examples of recent subject-specific word list development include Valipouri and Nassaji (2013) on academic vocabulary in chemistry, and Yang’s (2015) academic word list for nursing.

While word list research can help identify vocabulary across or within disciplines, there is still a major issue in deciding just how specialised a word might be. In some ways, working
out which words might be technical is easier for lexical items which occur within a narrow field because they are immediately recognisable as technical in nature. Some examples include *sternum*, *costal*, and *vertebrae* in anatomy (Chung & Nation 2003). These researchers used a scale to identify the technical vocabulary of an anatomy textbook. The steps in the scale range from words that have no connection to the field of anatomy to those that only occur in that field/are unlikely to be known outside that field. The group of words on the scale is for function words that are not related to anatomy, for example, *adjacent*, *early*, and *between*. The second group is for words that have a minimal relationship to the field of anatomy, such as *structures*, *supports*, and *protects*. The items in groups 1 and 2 are not considered technical vocabulary, according to Chung and Nation (2004: 253). The third group is for words that are more closely connected to anatomy, including words such as *liver*, *skin*, and *muscles*. The final group is for words that are specific to anatomy, including *hematopoietic*, *demifacets*, and *pedicle*. The researchers used the same technique on an applied linguistics text and found that approximately 20 per cent of the applied linguistics text were in the third and fourth groups, and were therefore technical. However, more words from the applied linguistics text (around 88 per cent) occurred outside that specialised subject area. Categorising words may seem relatively straightforward but it demands a great deal of skill, specialised knowledge of a field, and decision-making.

A fairly quick way of finding technical vocabulary is by comparing a specialised and general purpose corpus as reported in Chung and Nation (2004). Items which occur in only the technical corpus are labelled ‘technical’. Items in the general corpus are clearly not technical. Items which occur in both corpora are then designated technical or general based on a ratio depending on their frequency in either corpus. Chung & Nation (2004: 259) decided on a ratio of 50 occurrences in the specialised corpus to one occurrence in the general corpus and found that with this ratio, lexical items had more than a 90 per cent chance of being technical vocabulary.

In a study of the level of specificity in the writing of university students in the UK, Durrant (2014) drew on the five million-word British Academic Written Corpus (BAWE) (Nesi et al. 2007). Durrant shows that the writing in the corpus in the different disciplines is very diverse, but the amount of specialised vocabulary differs across disciplines. This finding, as Durrant (2014: 353) points out, is in line with Chung and Nation’s (2003) work using the scale outlined above.

**High frequency words with technical meanings**

The second issue with academic and disciplinary vocabulary relates to the previous one in that high frequency words can occur with technical meanings in academic texts. That is, everyday words can take on specialised meanings in particular contexts; for example *print* in computer science and *output* in applied linguistics. Sutarsyah, Nation and Kennedy’s (1994) study of an economics textbook found 34 words (including *cost*, *supply*, and *average*) occurred on average once every ten words in the text. They also found that 20 of these words were clearly essential to economics. Quero’s (2013) analysis of technical vocabulary in medical texts found a large number of items which might appear to be more general purpose than specific, including names such as *Stevens-Johnson*, and words such as *TEN*, *FISH*, *radical*, and *culture*. These items all have highly technical meanings in medical texts. *Stevens-Johnson syndrome* is a possibly life-threatening skin condition. TEN stands for *toxic epidermal necrolysis*, and *FISH* stands for *fluorescence in situ hybridisation*. *Radical* is a common collocation in medical texts for *free radical*, and *cultures* are used in laboratory procedures. Hyland and Tse’s (2007)
study of collocations and bundles in academic writing suggests that corpus analysis can help distinguish between instances where everyday words are being used with a technical meaning.

The examples above illustrate some of the learning burden for second and foreign learners of English as they acquire academic and disciplinary vocabulary. However, this burden does not necessarily only present itself to second or foreign language learners of English. Native speakers of English also have to learn specialised or technical vocabulary as part of their studies in secondary school (see Coxhead 2011b) and university studies, as demonstrated by work such as Basturkmen and Shackleford (2015) in accounting.

**Multi-word units and metaphor in EAP**

The third issue is the categorisation and learning of multi-word units and metaphor in EAP. Multi-word units might include common collocations (such as *significant finding* and *data analysis*) as well as bundles of three or four words (for example, *as a result of/on the basis of*). The gathering of large corpora and analysis of vocabulary patterns in different academic subjects has begun to shed light on the frequency, roles, and use of such units.

Studies on collocations in academic and discipline specific contexts are beginning to appear in the literature. A recent example of word list research in this area is Ackermann and Chen’s (2013) academic collocation list. Durrant (2009) carried out a large-scale study of academic collocations in a 25-million-word academic corpus across five academic disciplines. Table 14.1 lists the top ten collocations from his study.

Crawford Camiciottoli (2007) finds some interesting examples of word compounds in her 109,449-word corpus of twelve business lectures, including *bottom-up*, *cost-cutting*, and *cure-all* (2007: 139–140). Table 14.2 shows the most frequent two- and three-word phrases in a corpus of Business English from Nelson (n.d.), and three-word bundles in Crawford Camiciottoli (2007). The two-word phrases from Nelson and the three-word lexical bundles from Crawford Camiciottoli appear to be much more closely aligned to Business English than the three-word phrases.

Other examples of recent collocation work can be found in Liu (2012). For more on multi-word units in academic written and spoken texts, see Biber (2006).

Hyland’s (2008) analysis of a corpus of professional and student academic written English looked at lexical bundles across four academic disciplines: electrical engineering, biology, business studies, and applied linguistics. Hyland (2008: 12) finds differences in the frequency and distribution of these bundles in the different disciplines. In an analysis of the top 50 bundles from each discipline, over 50 per cent occur only in one discipline, and only 30 per cent are shared in two other disciplines. The bundles are then categorised according to a modification of Biber’s (2006) framework, and three main categories emerge: research-oriented bundles such as *in the present study*; text-oriented bundles such as *in addition to*; and participant-oriented bundles such as *it should be noted that*. Other studies focussed on lexical bundles in academic texts include Ådel and Erman (2012); Biber, Conrad and Cortes (2004); Cortes (2004); and Byrd and Coxhead (2010).

In the spoken and written Academic Formulas List (AFL; Simpson-Vlach and Ellis 2010), formulas are categorised into their functions; for example formulas of contrast and comparison (p. 499) such as *and the same* and *as opposed to* occur in both speaking and writing; *(nothing) to do* and *the same thing* are primarily from spoken data; *be related to the and is more likely* are primarily written data. This list is interesting because the researchers included ‘teachability’ as one of the principles for item selection, alongside frequency.
Acquiring academic and disciplinary vocabulary

Table 14.1 Top ten key academic collocations and their mean frequencies from Durrant (2009: 166)

<table>
<thead>
<tr>
<th>Word 1</th>
<th>Word 2</th>
<th>Mean frequency/million words</th>
</tr>
</thead>
<tbody>
<tr>
<td>this paper</td>
<td>163.68</td>
<td></td>
</tr>
<tr>
<td>associated</td>
<td>with</td>
<td>315.52</td>
</tr>
<tr>
<td>this study</td>
<td>296.96</td>
<td></td>
</tr>
<tr>
<td>based on</td>
<td>404.64</td>
<td></td>
</tr>
<tr>
<td>and</td>
<td>respectively</td>
<td>249.68</td>
</tr>
<tr>
<td>due to</td>
<td>374.12</td>
<td></td>
</tr>
<tr>
<td>consistent</td>
<td>with</td>
<td>121.88</td>
</tr>
<tr>
<td>between and</td>
<td>935.56</td>
<td></td>
</tr>
<tr>
<td>was</td>
<td>performed</td>
<td>84.8</td>
</tr>
<tr>
<td>related to</td>
<td>190.72</td>
<td></td>
</tr>
</tbody>
</table>

Table 14.2 The most frequent two- and three-word phrases in Nelson (n.d.), and three-word bundles in Crawford Camiciottoli (2007)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>interest rates</td>
<td>a lot of</td>
<td>local productive systems</td>
</tr>
<tr>
<td>cash flow</td>
<td>one of the</td>
<td>option value model</td>
</tr>
<tr>
<td>market share</td>
<td>the end of</td>
<td>factors of production</td>
</tr>
<tr>
<td>stock market</td>
<td>in order to</td>
<td>the GDP deflator</td>
</tr>
<tr>
<td>Wall Street</td>
<td>we need to</td>
<td>high-tech companies</td>
</tr>
</tbody>
</table>

One problem in identifying long and sometimes quite complex noun phrases that are common in academic writing (Biber 2006) is that patterns might not be continuous in texts. For example, a target bundle from academic texts might be ‘the consequences of + noun’, which is part of a highly frequent frame ‘the XXX of XXX’. An example from analysis of a written academic corpus shows that while ‘the consequences of + noun’ is used in academic corpus, the frame can include a range of other items as well, as can be seen in the examples in Box 14.1.

Box 14.1 Examples of ‘the consequences of + noun’ in a written academic corpus

- the income tax consequences of payments
- the tax consequences of leases
- the concrete social consequences of
While the frame of ‘the XXX of XXX’ might be frequency in academic texts, actual strings such as *on the basis of* may not occur very often at all. For example, *on the basis of* occurs only 308 times in a 3.5-million-word corpus of academic writing. That is, it occurs 106 times per million words, or 53 times in 500,000 words, or just twice in 15,625 words (Byrd & Coxhead 2010: 47).

**Metaphor in EAP**

Metaphor can be seen as another type of multi-word unit in vocabulary studies. It is important in EAP for several reasons. The first is that metaphor makes up a reasonable percentage of academic spoken language. In a UK-based study of metaphor in four 11-minute university lectures from the British Academic Spoken Corpus (BASE) (for more on this corpus, see [www2.warwick.ac.uk/fac/soc/al/research/collect/base/](http://www2.warwick.ac.uk/fac/soc/al/research/collect/base/)), Littlemore et al. (2011) found the density of metaphors was 4.1 per cent. The second reason is that EAP learners do not necessarily find metaphors easy to understand. In the same study, Littlemore et al. (2011) found that out of 132 (on average) problematic items in a lecture, 50 (38 per cent) were metaphorically used words that students perceived as problematic. Littlemore et al. (2011: 418) note,

> In sum, across the lectures overall, an average of around 42 per cent of the words or phrases that a student found difficult to understand were, in fact, metaphorically used items. The reason for such metaphor use was to enhance comprehension of the lecture topic, through explanation, exemplification, evaluation, and so forth.

Furthermore, of those problematic ones, students were not able to explain the meaning of almost 50 per cent of the metaphors that were used. Littlemore (2001) found comprehension problems for 20 Bangladeshi postgraduate students in lectures because the students often missed the evaluative component of the lecture. This is an important finding given that evaluation is one of the functions of metaphor use, as well as a core activity of academic studies.

**Current practice worldwide**

This section looks at a range of research into teaching and learning academic and specialised vocabulary in a variety of contexts and countries.

**Classroom-based studies**

In a study by Peters and Fernández (2013), the researchers wanted to find out what kinds of vocabulary their Spanish building engineering or architecture students needed help with, and what resources they used in their studies to help them with unknown vocabulary. Examples of words from this study include: *benefit, cladding, crack duct, insulation, lintel, lump, measure, porous, resources, straw, and stress*. The authors found that the learners tended to look up technical words in dictionaries (such as *gutter, façade, and rubble*). But they also found that general and scientific vocabulary, such as *framework, sustainability, and consumption* caused more problems for them than the technical words.

Basturkmen and Shackleford (2015) observed two accountancy lecturers in two sets of two-hour classes over a three-week period in a higher education institute in New Zealand and found 46 per cent (76 out of 164) of the language-related episodes targeted a word form.
Acquiring academic and disciplinary vocabulary

That is, there were on average 20 vocabulary-related episodes per hour, which the researchers (2014: 94) suggest is evidence of the importance to the lecturing staff of vocabulary to the content and learning of the students in their study.

An example of a vocabulary-related episode is in Box 14.2. In this example, the lecturer explains what ‘delayed payment to trades payable’ means, using a short definition and an example. Such examples demonstrate how the lecturer actively helped the students, through definitions and an example, with the technical language of accountancy while lecturing the content of the subject (Basturkmen & Shackleford 2015: 92).

Other studies have focussed on the teaching and learning of multi-word units in classrooms. Jones and Haywood (2004), for example, looked at the learning of formulaic sequences in an EAP context in the UK. The researchers/teachers employed a range of teaching methods to draw their learners’ attention to lexical bundles in texts and to encourage the use of these formulaic sequences in the participants’ writing. The findings suggest that although the participants’ awareness of formulaic sequences was raised as a result of this study, the researchers find little evidence of actual use of the sequences in the participants’ essay writing. A study in Kuwait in 2012 by Alali and Schmitt (2012) compared single-word learning with learning idioms among 35 participants from an international girls’ school. These participants were 12–13 years old. The researchers found better gains in learning for single words than idioms for these participants. Alali and Schmitt (2012) conclude that, in terms of engagement, learning idioms is similar to the learning of single words and that repetition, as found in many other vocabulary studies, has a strong effect on learning.

**Box 14.2 An example of a vocabulary-related episode from Basturkmen & Shackleford (2015: 92)**

L: What are the options in terms of using that as influencing your internal finance?

(silence)

L: See the bit in the middle – delayed payment to trades payable.

Pay more slowly. Your suppliers have done a job for you – he wants his money within 30 days. You give it to him after 45 or 60. Push him out to two months. It means you keep your funds internally.

Technology and specialised vocabulary learning

Csomay and Petrović (2012) investigated the potential for learning legal terminology from discipline-specific television shows and movies. The researchers selected lexical items in their study using both their corpus and legal dictionary searches. Technical law terms included bar, arrest, constitute, deny, court, document, permit, warrant, and excuse. Their 128,897 running word corpus contained seven movies (for example, *A Few Good Men* and *Runaway Jury*) and five episodes of the long-running television series, *Law and Order*. The researchers found 22.4 technical word families per movie and 12.2 technical word families per TV episode. These technical terms were not dispersed evenly throughout the movies and TV shows, but were unevenly distributed between scenes. Technical vocabulary accounts for over 5 per cent of their corpus.

Csomay and Petrović (2012) divided the technical terms in their study by frequency and used concordance data from their corpus to support vocabulary learning in their classes.
Table 14.3 shows examples of the use of *argue*, *depose/deposition*, and *client* (in capital letters in the table) from *The Rainmaker* movie, adapted from Csomay and Petrović (2012: 312).

The spoken language from the movie may be useful in the classroom by serving as an interesting and helpful comparison with the way these words might be used in a variety of discipline-specific written documents.

The availability of electronic texts and concordancing software means students now have ready access to corpora. Cobb’s (n.d.) Compleat Lexical Tutor website has several specialised corpora, such as medicine. Students can also build their own corpora. Participants in Charles’s (2012: 100) do-it-yourself (DIY) corpus building study saw advantages in this approach because of the relevance to their own academic studies in terms of sharing the same discipline-specific vocabulary in their own writing and in their corpora. DIY corpus building supported their understanding of this vocabulary and the context of its use.

Rusanganwa’s (2013) study investigated the learning of technical vocabulary (for example, *parallel-plate-capacitor*) by undergraduate students of physics at a university in Rwanda. The researcher compared the impact on vocabulary learning through multimedia presentations of images, graphics, texts, and animations with traditional blackboard approaches using blackboards to convey the same information. In both modes, students could pronounce key lexical items, discuss ideas, and make notes. The analysis shows that the multimedia group made more gains in knowledge of the target vocabulary in post-tests. Work by researchers such as Rusanganwa needs to fostered and supported in many countries where access to computers or textbooks might be limited.

**Table 14.3** Examples of frequency bands of technical items from *The Rainmaker* (adapted from Csomay & Petrović 2012: 312)

<table>
<thead>
<tr>
<th>Bands</th>
<th>The Rainmaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (5–7 encounters)</td>
<td>We’re gonna ARGUE Great Benefit’s motion to dismiss</td>
</tr>
<tr>
<td></td>
<td>I’m prepared to ARGUE the motion</td>
</tr>
<tr>
<td></td>
<td>Let him ARGUE the case</td>
</tr>
<tr>
<td>2 (8–9 encounters)</td>
<td>I come from Memphis to DEPOSE four people</td>
</tr>
<tr>
<td></td>
<td>I’m going to DEPOSE Mr Lefkin, then I’m going to go</td>
</tr>
<tr>
<td></td>
<td>The DEPOSITION is set for next Thursday afternoon</td>
</tr>
<tr>
<td></td>
<td>I’m going to take DEPOSITIONS from all the executives</td>
</tr>
<tr>
<td>3 (10+ encounters)</td>
<td>You should fight for your CLIENT</td>
</tr>
<tr>
<td></td>
<td>She no longer works for our CLIENT</td>
</tr>
<tr>
<td></td>
<td>Your CLIENT has a million dollars</td>
</tr>
</tbody>
</table>

Table 14.3 shows examples of the use of *argue*, *depose/deposition*, and *client* (in capital letters in the table) from *The Rainmaker* movie, adapted from Csomay and Petrović (2012: 312).

The spoken language from the movie may be useful in the classroom by serving as an interesting and helpful comparison with the way these words might be used in a variety of discipline-specific written documents.

The availability of electronic texts and concordancing software means students now have ready access to corpora. Cobb’s (n.d.) Compleat Lexical Tutor website has several specialised corpora, such as medicine. Students can also build their own corpora. Participants in Charles’s (2012: 100) do-it-yourself (DIY) corpus building study saw advantages in this approach because of the relevance to their own academic studies in terms of sharing the same discipline-specific vocabulary in their own writing and in their corpora. DIY corpus building supported their understanding of this vocabulary and the context of its use.

Rusanganwa’s (2013) study investigated the learning of technical vocabulary (for example, *parallel-plate-capacitor*) by undergraduate students of physics at a university in Rwanda. The researcher compared the impact on vocabulary learning through multimedia presentations of images, graphics, texts, and animations with traditional blackboard approaches using blackboards to convey the same information. In both modes, students could pronounce key lexical items, discuss ideas, and make notes. The analysis shows that the multimedia group made more gains in knowledge of the target vocabulary in post-tests. Work by researchers such as Rusanganwa needs to fostered and supported in many countries where access to computers or textbooks might be limited.

**Recommendations for practice**

Nation’s (2007) Four Strands is a useful framework for analysing vocabulary learning activities and vocabulary curriculum design. The four strands are:

- meaning-focused input (learning through reading and listening);
- meaning-focused output (where learning is through writing and speaking);
- language-focused learning (where learners deliberately study aspects of words such as pronunciation and spelling);
- fluency development.
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See Hirsh and Coxhead (2009) for suggestions on incorporating Nation’s strands into the design of Science-specific vocabulary learning.

A scale like Chung and Nation’s (2003) can be adapted so that teachers and students can make use of them to decide which words they need to focus on in class or independent learning and why (see Coxhead 2014). Learners benefit from learning to notice common patterns such as the consequences of occur in their academic texts, and notice how patterns might differ across disciplines or subject areas. They can also learn how to use these patterns accurately and fluently in their academic speaking and writing. Teachers can use data like those in Table 14.3 from Csomay and Petrović (2012) to raise awareness of the presence and patterning of technical vocabulary from a corpus before or after watching the movie or TV programme in which the items appear. As an example of a post-watching activity, teachers could have learners rank the vocabulary items in terms of their connection to law or degree of technicality. To find out about the vocabulary used in specialised texts, teachers can analyse their own texts, as well as those of their learners’ texts using Cobb’s (n.d.) Compleat Lexical Tutor website.

Coxhead (2011c) found negative effects for students when they are pushed to produce vocabulary in writing, including anxiety and interference between words that look similar. For example, one of the writers in Coxhead’s study (2011c: 10), Crystal, struggled with the words ethic and ethnic, which she encountered in the source reading for her writing and was asked to include in her own essay writing. Crystal said,

[I] didn’t use it [ethic] because of ethnical/ethnic. It means standard of behaviour. These two words got similar spelling, I was just afraid I mix them up. Tried to use but because there was ethnic, it confused me and there was not lots of time so I give up [sic].

Finally, a note of caution is needed with word lists for pedagogical purposes. Teachers and learners need to know how and why a word list was developed, what decisions were made along the way, and why. They need to know whether a word list has been validated in some way. Furthermore, Durrant (2014) encourages us to consider not only the vocabulary learners are exposed to, but what they themselves produce in their specialised areas. When it comes to specialisation through academic studies, it is important to find out at what point it is better for learners with special purposes to start focussing on learning the specialised vocabulary of their chosen field (see Coxhead & Hirsh 2007).

Future directions

As we have seen in this chapter, the range of studies in this area is ever-expanding. One avenue of future research is more in-depth investigations of multi-word units in use in a wider variety of subject areas. A stronger focus on learning and teaching in classrooms, independently, and in virtual environments is also needed, particularly in little-researched areas of the world. While this handbook focusses on English for academic purposes, another possible area of enquiry for the future could be academic and discipline-specific vocabulary in languages other than English.

Further reading

Coxhead (2010); Nation (2013: see particularly Chapter 6 on ‘specialised uses of vocabulary)
Related chapters

2 General and specific EAP
13 Listening to lectures
16 Corpus studies in EAP

References


Byrd, P. & Coxhead, A. (2010). On the other hand: Lexical bundles in academic writing and in the teaching of EAP. *University of Sydney Papers in TESOL*. 5. 31–64.


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