Free Online Resources for Vocabulary Learning

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語彙学習のための無料オンラインリソース

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　無料のオンライン語彙学習リソースが多数あります。教師と学習者にとっての課題は、言語発達の特定の段階で特定の学習目標を達成するのにどれが最も有用かを特定することです。本論では、調査結果によって支持されており、幅広い潜在的利用者を持つと考えられている重要なリソースをいくつか紹介します。単語リスト、フラッシュカード、使用語彙のレベルを測定するLexical Frequency Profile（LFP）と呼ばれるプログラム、語彙テストに特に留意します。この精査によって、教師が教材についてより適切な情報に基づいた決定を下し、学習者の進歩をより正確に評価できるようになることが期待されます。学習者にとって、オンラインツールは、目標を設定し、学習者の語彙学習習慣を向上させるのに役立つと考えられます。

　There are many free online vocabulary learning resources. The challenge for teachers and learners is to identify which are the most useful in meeting specific learning goals at particular stages of language development. This paper will introduce some key resources that have been supported by research findings and are believed to have a wide range of potential users. Special attention will be given to word lists, flashcards, lexical profilers, and vocabulary tests. It is hoped that this review will enable teachers to make better informed decisions about the teaching materials and assess learners' progress more accurately. For learners, the online tools may be useful in setting goals and enhancing their vocabulary learning practices.

1．Word lists

Learning the vocabulary of a foreign language can be a daunting task. There are hundreds of thousands of words in a language, and they cannot all be explicitly taught. Classroom efforts should therefore be directed at those words that are likely to be most useful for learners.

The basic idea underpinning word lists is that lexical items in any language can be grouped at successive levels based on the frequency with which they occur in a particular corpus. They play an important role in language teaching and lexicography. Word lists help teachers, textbook writers, and learners identify which words are most useful to focus on with respect to proficiency level and specific learning goals. They also help lexicographers ensure that important words are not overlooked.

Based on discourse type, word lists can be broadly divided into *general word lists, lists of technical words*（terminology that is field specific）, and *academic word lists*（words that are common across different academic disciplines）. Because subject-specific word lists tend to have a more limited number of users, this paper will focus on general and academic word lists.

1.1　General word lists

1.1.1　General Service List（GSL）/ The New General Service List（new-GSL）

One of the oldest high-frequency word lists is the *General Service*

List (GSL), which was published by Michael West in 1953. Over the last sixty years this list has been widely used for both pedagogical and research purposes. The development of GSL was based on more than two decades of pre-computer research on written English corpus and contains 2,168 word families. These provide approximately 81% coverage of written texts and 86% coverage of spoken English (Webb & Nation, 2017). In the original version, each entry included information about the frequency of the main headword as well as different meanings and the relative frequency of different parts of speech. Examples of usage were also provided. Although this information enabled language learners to see how the word is typically used and which meaning is the most important, no new print editions of GSL have been published. Instead, there are various simplified online versions available that often only include the headwords. Some GSL sites list the words in alphabetical order <https://www.eapfoundation.com/vocab/general/gsl/alphabetical>, while others use frequency rankings <http://kgn.kufs.ac.jp/SELHi/pdf/H17_ReferenceData.pdf>.

Although GSL has been extremely influential, concerns have been raised in recent years about a certain level of subjectivity in the selection criteria that West applied (McEnery & Hardie, 2011). For instance, in addition to word frequency, lexical items were evaluated in terms of their ease of learning, necessity, coverage, and stylistic and emotional neutrality. Furthermore, some of the items in the list seem archaic (e.g., *shilling, milkmaid, telegraph*...) and several

high-frequency words have been omitted (e.g., *computer, television, Internet*…). Several attempts have since been made to improve West's list, including a major update in 2015 when Brezina and Gablasova published a *New General Service List* (new-GSL) in the August issue of *Applied Linguistics*. Since 2015, their paper and the new-GSL list have been available as an open access source ＜https://doi.org/10.1093/applin/amt018＞. Unlike the original GSL, which was based on a 5 million word corpus, the new GSL is based on the analysis of four language corpora (three written corpora and one corpora with a written and spoken component) with a total size of over 12 billion running words. The list, which can be found in the supplementary data section of Brezina and Gablasova's (2015) paper, was compiled using only a quantitative approach, with criteria for word inclusion limited to word frequency, dispersion, and stability of a lexical item across different corpora. It uses lemmas (words and their inflectional suffixes) as an organizing principle. The list achieves approximately the same coverage as the original GSL but with a reduction of about 40% in the number of lemmas (the new GSL includes 2,494 lemmas compared to 4,114 in West's original list).

The list can be divided into a base part containing 2,116 items that belong to a stable lexical core and a current vocabulary part containing 378 items that reflect more recent developments in vocabulary. The words are listed in alphabetical order. The 500 most frequent words are shown in bold red capital letters. The 501 to 1000 most frequent words are given in bold type while the rest of the list is

in plain type. Italics are used to indicate current vocabulary. The list also includes information on the parts of speech and word ranking.

1.1.2 The BNC/COCA headword lists

The BNC/COCA list was composed based on frequency and range data from the British National Corpus (BNC) and Corpus of Contemporary American English (COCA). It contains the headwords of 25,000 word families, which are divided into downloadable files by frequency of 1,000 words. In each sub-file, the headwords are listed in alphabetical order. No distinction is made between function and content words. The list provides coverage of about 87% of spoken English and 82% of written English texts (Webb & Nation, 2017). The first 2,000 or 3,000 words can be viewed as an alternative to the GSL. The BNC/COCA headword lists can be accessed from Paul Nation's website <https://www.victoria.ac.nz/lals/about/staff/paul-nation#vocab-lists>.

1.1.3 Essential Word List

The *Essential Word List* (EWL), developed by Dang and Webb in 2016, focuses on L2 beginners. It was created according to criteria such as practicability in terms of teaching objectives, changes in the lexical coverage curve, and the amount of lexical coverage in multiple lexical corpora that represent different varieties of English. The target words were selected using *family lemmas* or *flemmas* (lemmas that do not distinguish between different parts of speech) rather than word families as a unit of counting, This assumes that most beginners

will have limited morphological awareness and therefore may not recognize different derivational forms. The list consists of 176 function words and 624 content words, providing coverage of approximately 75% of spoken and written texts. The content words are divided into 12 sub-lists of 50 words and one sub-list of 24 words. Because the sub-lists are given in order of decreasing mean-coverage, following their rank-order ensures that the most useful words are learned first. Furthermore, the division in the sub-lists can help textbook writers and course designers develop teaching materials and language programmes that cover essential words while avoiding unnecessary repetition across the curriculum. The EWL can be accessed from Stuart Webb's website ＜https://www.edu.uwo.ca/facultyprofiles/stuart-webb.html＞.

1.1.4　*The Phrasal Expressions List*

In addition to the single-word lists introduced in the previous section, another useful resource for teachers and language learners is *The Phrasal Expression List* (Martinez & Schmitt, 2012). The list contains 505 of the most frequent, non-transparent, formulaic multi-word expressions in English that are likely to pose difficulty for L2 learners. Formulaic expressions play an important role in language use, processing, and acquisition (Moon 1998; Nattinger & DeCarrico, 1992; Wray, 2002). They make up a large portion of both written and spoken texts. Data from Erman and Warren (2000) suggest that phrasal expressions constitute about 58.6% of spoken English discourse and 52.3% of written discourse. Formulaic language has been

recognized as an essential component of communicative competence and language fluency for many years (Boers, Eyckmans, Kappel, Stengers, & Demecheleer, 2006; Ellis & Sinclair, 1996). Therefore, it is important for these expressions to receive sufficient attention in language teaching materials and school curricula. *The Phrasal Expression List* represents the first attempt to present formulaic sequences in a principled, systematic way. Both the list and the users' guide can be downloaded from Norbert Schmitt's website <https://www.norbertschmitt.co.uk/vocabulary-resources>.

1.2 Academic word lists

Academic word lists consist of lexical items beyond the first 2,000~3,000 high-frequency words which commonly occur across a range of academic disciplines but are relatively uncommon in other types of texts (Coxhead & Nation, 2001). Knowledge of these words is considered essential for language learners who will be engaged in academic studies.

1.2.1 *The Academic Word List (AWL)*

The best-known list of academic vocabulary is *The Academic Word List (AWL)*, compiled by Averil Coxhead (2000). The list includes 570 word families outside the GSL, selected from a written corpus of academic English. The Academic Corpus contains 414 texts (journal articles, book chapters, course workbooks, laboratory manuals, and course notes) from 28 subject areas in the disciplines of Science, Arts, Commerce and Law, with a total size of approximately 3.5 million

running words. Three selection criteria were applied: (1) range, (2) frequency, and (3) uniformity of frequency.

To be included in the list, selected AWL families had to occur in all four disciplines and in more than half of the 28 subjects of the Academic Corpus at least 100 times. To ensure that the list will be useful for all learners, the AWL families also had to appear a minimum of 10 times in each of the four groupings within the Academic Corpus to be included. The list has since been divided into 9 sub-lists of 60 word families and one sub-list with 30 families based on their range and frequency of occurrence. The list of headwords in the AWL can be downloaded from Averil Coxhead's website <https://www.victoria. ac.nz/lals/resources/academicwordlist/awlheadwords/headwords-of-the-Academic-Word-List.pdf>.

The AWL has been incorporated into many EAP textbooks and free online resources are also available that allow learners to practice these words. One useful site is Gerry Luton's *Vocabulary Exercises for Academic Word List* <http://www.englishvocabularyexercises. com/AWL/>, which includes 285 gap-fill exercises that can be used to review the word families contained in the AWL. The exercises follow Coxhead's sub-list division. However, to make learning easier, the list of headwords in each sub-list includes audio pronunciation as well as definitions of the target words. Each sub-list has been further divided into six groups, each of which contains five gap-fill exercises. Each exercise consists of ten gapped sentences that learners

need to complete by selecting the correct word from a scroll down menu containing ten options. Many of the exercises include different derivational forms of the headwords. By clicking on the [Check] button, learners can receive immediate feedback on their answers. They are advised to complete all the exercises for each group of words and each sub-list before proceeding to the next sub-list.

Although the AWL has been widely used for almost two decades, several limitations have been noted. The first concerns the validity of the AWL. The AWL was developed as an extension of Michael West's GSL (1953). It was assumed that learners who engage with the AWL will have mastered the first 2,000 most frequent words. However, running the AWL headwords through the BNC version of *Range* software, which is used to analyse the vocabulary load of texts, has shown that about 50% of AWL words would now be classified as high-frequency words (Cobb, 2010).

Furthermore, several recent studies have found that unassisted reading requires knowledge of 98% of the text lexis (Hu & Nation, 2000). That level is achieved when learners know about 8,000~9,000 word families for written texts and 6,000~7,000 for spoken discourse (Nation, 2006). This means that, even if learners master all the AWL headwords, they are still likely to experience difficulties in comprehending academic English.

Some concerns were also expressed regarding the extent to which

the AWL is truly representative of vocabulary across a wide range of academic disciplines. Hyland and Tse（2007）examined the distribution of 570 word families from Coxhead's list in a 3.3 million word corpus comprising texts from a wide range of academic disciplines and genres. They found that although the AWL provided remarkable overall coverage of 10.6% of the corpus, this was not evenly distributed. There were significant differences in terms of range, frequency, and the collocational and semantic behaviour of individual lexical items across academic disciplines. Hyland and Tse （2007）concluded that a more restricted, disciplinary-based approach is needed to assist learners with the comprehension of academic texts.

Finally, the AWL seems to be geared towards written academic English. Dang and Webb（2014）analysed the vocabulary in 160 lectures and 39 seminars from four sub-corpora of the British Academic Spoken English（Art and Humanities, Life and Medical Sciences, Physical Sciences and Social Sciences）and found that the AWL provided a modest 4.41% coverage of academic spoken English. Text coverage is considered to be one of the most important factors in text comprehension（Laufer & Sim, 1985）. Earlier studies （e.g., Nation, 2006; Van-Zeeland & Schmitt, 2012）have shown that 95% text coverage is needed for good but incomplete listening comprehension, while as much as 98% coverage may be needed for high comprehension of general spoken English. The fact that GSL gives approximately 86% coverage of the spoken texts（Webb & Nation, 2017）means that a learner who has mastered all the words

on both GSL and AWL lists would still understand only about 90% of the academic spoken texts. While the AWL can support listening comprehension in academic contexts, the figures above highlight the need to develop a new word list that specifies the words needed for the comprehension of academic spoken English.

1.2.2   The Academic Formulas List (AFL)

Knowledge of formulaic sequences has been found to promote native-like selection of lexical items as well as automaticity in language processing and fluency in language expression (Ellis, 2009; Pawley & Syder, 1983). The *Academic Formulas List* (AFL), developed by Simpson-Vlach and Ellis (2010), consists of formulaic sequences that are common in spoken and written academic texts. The sequences are classified into three sub-lists: a list of core expressions that includes 207 phrases common in both academic spoken and written texts, 200 phrases common in spoken language, and 200 phrases common in academic written texts. The inclusion of spoken language is especially worth noting. As Simpson-Vlach and Ellis (2010) found in their review of earlier studies (e.g., Brazil, 1995; Leech, 2000), spoken language contains more collocations than written language and, because speech happens in real time, places more pressure on working memory. Therefore, the need for prefabricated language is stronger during speech production than when writing (Kuiper, 1996).

The list was composed following a computer-based analysis of speech and writing corpora, each consisting of 2.1 million words and covering

several academic disciplines. Both quantitative and qualitative criteria were applied. To be included in the list, the phrases had to have a minimum frequency of ten instances per million words and be characteristic of academic discourse rather than general English. In addition to frequency, the mutual information score（MI）for each string was also calculated. A higher MI score indicates a stronger association between the words, while lower scores mean that co-occurrence may be a matter of chance. Although both phrase frequency and MI scores were considered, MI values were favoured in the case of ranking differences. Judgments of experienced EAP and ESL instructors regarding the educational validity of the expressions were also taken into account. For pedagogical purposes, the selected phrases were grouped into three categories: *referential expressions, stance expressions*, and *discourse organizing functions*. The main text of the article provides a functional taxonomy of these phrases, with each category being further divided into sub-categories and functional groups such as *specification of attributes, identification and focus, contrast and comparison*, and so on. In addition to this detailed classification, a complete list of selected expressions by genre（core, spoken, and written）can be found in the appendix of Simpson-Vlach and Ellis's（2010）paper. The article can be downloaded from Nick Ellis's website ＜http://www-personal.umich.edu/˜ncellis/NickEllis/Publications_files/AFL_paper_AppLinxPrepub.pdf＞.

1.2.3　The Academic Collocation List（ACL）

The *Academic Collocation List*（ACL）consists of 2,469 collocations

common in academic written English. The list was derived from the 25-million word Pearson International Corpus of Academic English developed by Kirsten Ackermann and Yu-Hua Chen. Ackermann and Chen（2013）used a mixed-method approach comprising corpus statistics and expert judgment to identify the most frequent and pedagogically relevant lexical collocations across 28 academic disciplines. In addition to the list of headwords, collocations were also classified by part of speech with the final list containing 1,835 adjective/noun+noun combinations, 340 verb+noun/adjective combinations, 170 verb+adverb combinations, and 124 adverb+adjective combinations. Ackermann and Chen's paper, which describes the compilation process in detail, can be downloaded as a pdf. file from the Research Gate website ＜https://www.researchgate.net/publication/259161085_Developing_the_Academic_Collocation_List_ACL_-_A_corpus-driven_and_expert-judged_approach＞.

The complete ACL can be found on the EAP Foundation website ＜https://www.eapfoundation.com/vocab/academic/acl/＞. The original list has been adapted to allow searches by node word or the collocate. For example, the collocation *great accuracy* is listed twice under the headword *great* and under the headword *accurate*. The site also includes a link to another page where the selected collocations are grouped by part of speech. There are also links to an ACL highlighter and gap fill maker that allows users to identify academic collocations in a text and create practice exercises.

The ACL covers about 1.4% of academic written English, which means that the number of collocations in any given text will be relatively small. Nevertheless, given the importance of collocation knowledge for fluency and accuracy of learner expression, it is a valuable resource that can help teachers identify phrases that are overused or underused in learner output and set appropriate learning goals.

２．From word lists to vocabulary activities

Word lists help transform research findings into sound pedagogical practices. They provide guidance for material writers on how to sequence lexical items for both general and academic purposes. They also help teachers and learners focus their efforts on the most useful words. Once instructors know which words warrant attention, they can plan and develop activities for more focused vocabulary instruction. There are many useful online tools that can be used for vocabulary presentation, reinforcement, and testing. Some examples are flashcard software such as *Anki* and *Nakatango*, and *Vocabulary Match Maker*.

2.1　Flashcards

Flashcards are considered a very effective learning method for establishing form-meaning connections. In its traditional form, flashcards have the L2 word on one side and its L1 translation on the other. Learners can practice receptive recall by working through the L2 cards and trying to recall their L1 correspondents, or productive recall by working through the L1 cards and trying to retrieve L2

words.

Built into a flashcard activity are retrieval and spaced repetition, which are known to promote the formation of memory traces and, consequently, learning (Barcroft, 2007; Karpicke & Roediger, 2008; Padilla & Sung, 1990). In recent years, the development of educational technology has meant that many forms of flashcard software have been made available. This paper will review two of these: *Anki* and *Nakatango*.

2.1.1　Anki

Anki means "memorization" in Japanese. The software works on the principles of active recall testing and spaced repetition. Users can create their own decks by customizing the card layout, the number of cards, and review timing. The software supports image and sound storage, which means it is possible to design cards where new words are matched to pictures or written forms are matched with pronunciation. The default setting for the number of new cards is 20 and for review cards it is 100, although these numbers can be changed. The software uses Brainscape's Confidence-Based Repetition (CBR) ® algorithm, which allows learners to decide how frequently they want the cards to be repeated based on how confident they feel about the answers, optimizing their memory performance. There are three review options: [Again], [Good], and [Easy]. Pressing on [Again] makes the same card appear within a minute, allowing users to practice cards they did not answer correctly more intensively.

Pressing on［Good］makes the same card appear within 10 minutes depending on the number of cards in the deck. This option is suitable for cards which learners answered correctly but would like to practice further. For cards learners feel they have learned, the［Easy］option programmes the next review within four days. The colour coded counter at the bottom of the screen indicates the number of new cards, learning cards, and review cards within each deck. Users can also switch the front and back of the cards, leaving an option for bidirectional recall testing. There are also shared decks of flashcards for a number of academic disciplines, including foreign languages, geography, physics, chemistry, biology, and medicine. Shared decks for English include various grammar, vocabulary, and pronunciation exercises for different levels of proficiency with different review options.

Anki can be synchronised with *AnkiWeb*, a free online server, which allows learners to access their card decks on multiple computers or a smartphone. The *Anki* homepage includes a manual and several short instructional videos that can help familiarize first-time users with the features of the software. The software can be downloaded from ＜https://apps.ankiweb.net＞.

2.1.2　Nakatango / DIYNakatango

Nakatango and *DIYNakatango*（Nakata, 2017）are, like *Anki*, free open-course online flashcard programmes that work on principles of active testing recall and spaced repetition. *Nakatango* contains pre-

loaded decks of English-Japanese cards on which learners can practice general English vocabulary, academic vocabulary, or vocabulary for the TOEIC test. Learners can select how many words they want to study as well as the intensity of the practice at five different levels. There are also two response modes: a multiple-choice list or writing the target words.

DIYNakatango allows learners to create their own flashcards. First, they need to fill in [Cue] and [Response] boxes with the words they want to practice. Cues can be made at L1 or L2, depending on whether the learners want to practice receptive or productive retrieval. Both types of retrieval can facilitate vocabulary development; however, if only one type is to be used, productive retrieval (cue in L1, response in L2) is considered more effective as productive vocabulary knowledge includes receptive knowledge (Griffin & Harley, 1996). Users can then choose whether they want high, medium, or low intensity practice. A click on the [Start] key will result in Cue-Response pairs appearing on the screen one at time. After the whole set has been presented, responses will appear on the screen followed by a box in which learners are expected to write the target words. Each cue-response pair is presented several times based on the selected practice intensity. Although the instructions are given in Japanese, the design of the page is intuitive enough to allow non-Japanese speakers to navigate through it without difficulty. Both *Nakatango* and *DIYNakatango* can be accessed from Tatsuya Nakata's website <http://howtoeigo.net/research/software>.

2.2　*Vocabulary Match Maker*

Vocabulary Match Maker allows teachers to construct L1-L2 translation pair matching exercises. These can be used to give learners an initial understanding of the target words as well as checking their ability to recall the previously studied items. The software is very simple to use. There is a [Cue] box for the target words and a [Response] box for their definitions / L1 translations. Pressing a [Create] tab reshuffles the items in the [Response] box, generating a vocabulary matching activity followed by an Answer Key. This software can also be found at Tatsuya Nakata's website <http://howtoeigo.net/research/software>.

３．Lexical profilers

Lexical profilers are types of software that analyze the level of frequency with which words appear in a text. They have proved to be a useful tool in understanding lexical acquisition and monitoring the performance of L2 learners. The programs typically provide three types of information:

１．The percentage of words at each frequency level

２．A list of the words that occur at each frequency level

３．The number of times each word appears in the text

（Webb & Nation, 2017）

This information can help instructors and material writers identify the level of difficulty of a text. If instructors have learners' vocabulary size test scores and lexical profiler data, they can easily ascertain

whether a particular text is within the lexical range of their students. Lexical profilers can also help identify words that are likely to be challenging for a particular group of learners. The number of within-text occurrences can help highlight the words that are important for comprehension of a particular text. These words can then be replaced by simpler words, glossed over, or explicitly taught to the learners to increase text comprehensibility. Furthermore, the Lexical Profiler analysis of the texts generated by learners can provide some insight into the lexical complexity of their writing and the relationship between the growth of vocabulary size and vocabulary use in L2. (For more details on the use of profilers to measure lexical richness in L2 written production, see Laufer & Nation, 1995.) Finally, because they are simple to use, lexical profilers can be used to help learners make informed decisions about the relative importance of unknown words they encounter in the texts or to check on the range and variation of their productive vocabulary.

There are several online lexical profilers, three of which will be reviewed in this paper: *VocabProfile, Range*, and *AntWordProfiler*.

3.1 VocabProfile

VocabProfile is an online lexical analysis computer program developed by Tom Cobb (Université du Québec à Montréal). Thanks to its simple design, it is one of the easiest profilers to use for teaching and learning purposes. Based on corpus frequency counts, the software divides the words of any input text into four categories: (1) the most

frequent 1000 words in English（K1 words）,（2）the second most frequent thousand words（K2, i.e. 1001〜2000 words）,（3）academic vocabulary（AWL words）, and（4）off-list items that do not belong in any of the previous three categories. Frequency-based lexical breakdowns such as these can help instructors select appropriate reading materials for learners. In addition to the frequency figures, the analysis generates a colour-coded version of the input text that makes it easy to see which words fall into which frequency range. It is also possible to view the words grouped by frequency level and to check how many times each word is repeated in the text. The output window also shows the type / token ratio（TTR）（i.e. the number of different words in the text divided by the total number of words in that text）. A high TTR score indicates a high degree of lexical variation. Thus, an analysis performed on learner-generated texts can provide a valuable insight into the range and density of their productive vocabulary. If this data is combined with the results of tests of vocabulary size, it becomes possible to determine whether instruction should focus on increasing the number of words in learners' lexicons or activate knowledge of the words that already exist in their passive vocabularies. The software can also be used by the learners themselves to check on the complexity and variation of their productive vocabulary. *VocabProfile* can be accessed from Tom Cobb's *Compleat Lexical Tutor* website ＜https://www.lextutor.ca/vp/＞.

3.2 Range

Range is a powerful program that allows users to compare the vocabulary of up to 32 different texts of a very large size – a single text can have more than a million running words. It provides information about the distribution of each word across the texts, a frequency figure for the headwords, and a frequency figure for word families in all the texts. Thanks to these features, it is possible to identify vocabulary that is shared among several texts and to generate the lists of target words for learners based on their frequency or range.

Range also enables individual texts to be compared against GSL, AWL, and BNC/COCA lists or a user-generated list. This data can be used to examine the extent to which vocabulary knowledge affects text comprehension as well as for developing materials for test purposes.

Downloading the *Range* software folder also gives users access to the *Frequency* program, which can be used to generate a frequency list of all the words in a single text. This provides data on the rank order of the words, raw frequency counts, and the cumulative percentage frequency values. The output can be provided in alphabetical or frequency order.

Range has been released as an open-source software program and can be modified and distributed free of charge. It can be accessed from Paul Nation's website <http://www.vuw.ac.nz/lals/staff/Paul_Nation>.

3.3　AntWordProfiler

AntWordProfiler is another free online software program for corpus research on vocabulary profiling that was developed by Laurence Anthony of Waseda University, Tokyo. It comes with two tools:（1）*Vocabulary Profile Tool* and（2）*File Viewer and Editor Tool*.

The *Vocabulary Profile Tool* provides statistical and frequency information based on the comparisons of input texts against GSL, K1 and K2 lists, and the AWL list. The input files can be processed together or separately, and the analysis can be conducted on word types or word families. The output sorting options include alphabetical, range, and frequency order.

The *File Viewer and Editor Tool* provides a colour-coded version of the input text based on an analysis of word frequency. This means it is possible to edit the text and immediately see the effect of any changes made. Activating a thesaurus option underlines the items with thesaurus entries, allowing users to choose lower or higher level substitutes. *AntWordProfiler* is Unicode compliant and can handle data in all European and Asian languages.

The software is compatible with Windows, Macintosh, and Linux platforms and can be accessed from Laurence Anthony's website ＜http://www.laurenceanthony.net/software/antwordprofiler/＞.

4．Vocabulary Tests

Vocabulary tests play an important role in language teaching, both as a diagnostic tool and as a way of measuring learners' progress and/ or their proficiency level. Many types of online testing software have been developed over the last thirty years. The following section will review six of these: *Vocabulary Levels Test, Productive Vocabulary Levels Test, Vocabulary Size Test, Picture Vocabulary Size Test, Guessing from Context Test*, and *Word Part Levels Test*.

4.1 *Vocabulary Levels Test (VLT)*

The *Vocabulary Levels Test* (VLT) measures learners' ability to recognize form-meaning connections at different frequency levels. The test does not assess learners' productive vocabulary knowledge or their ability to use the words. The test should also not be confused with the test of vocabulary size as the VLT does not aim to estimate the overall number of words learners may know but rather their knowledge of particular word frequency levels. The theoretical assumption underpinning the VLT is that words differ in the amount of lexical coverage they have and, therefore, have different relative values for learners. The most frequent words are especially useful for learners as they are more likely to be encountered in written and spoken texts. If high frequency words have not been learned, knowledge of many low-frequency words will not necessarily result in good text comprehension.

The VLT was originally created by Nation (1983). This early version

measured word knowledge at four frequency levels: 2,000, 3,000, 5,000 and 10,000 words, as well as knowledge of words in the *University Word List* (UWL)[1]. The test used a matching format with 18 questions per level. The word family was used as the unit of counting. The target items were presented in six sets of six words from which test takers had to select three that match the corresponding definitions, also provided in L2. According to Nation (1983), although only 18 words were matched at each level, 36 words were tested because the distractors were also real words. The test was widely used for both assessment and research purposes as it was quick to complete and easy to mark.

Several new versions of the test have been developed over the years. Important improvements in the design aspects of the test were made by Schmitt, Schmitt, and Clapham (2001). Like the original test, Schmitt et al.'s (2001) test measures learners' knowledge of words at four distinct frequency levels (K2, K3, K5, and K10 words) and includes a section on academic vocabulary. However, the number of test items has been increased from 18 to 30 per level and academic words have been selected from Coxhead's (2000) *Academic Word List* rather than the UWL. The test items are presented in ten sets of six words: three target words and three distractors. Grammatical classes of test items reflect their proportional distribution in English. Five clusters test knowledge of nouns, three measure knowledge of verbs, and two clusters test knowledge of adjectives. Learners receive one point for each correct answer, which means that the maximum

score for each level is 30. The test can be used in its entirety or just partially, with learners completing only specific sections of the test. Two versions of the 2001 VLT can be downloaded from Norbert Schmitt's website <https://www.norbertschmitt.co.uk/vocabulary-resources>.

The latest version of the test developed by Webb, Sasao and Ballance (2017) retains the 50-question, 10-cluster format and the proportion of grammatical classes within each cluster (15 noun questions, 9 verb questions, and 6 adjective questions). Like the previous two tests, it adopts the word family as the unit of counting based on the rationale that the test measures receptive word knowledge and that learners are likely to be able to understand related unknown forms they may encounter when reading with relatively little effort. However, three important changes have been made to the test design. First, the test assesses learners' vocabulary knowledge at five frequency levels, from the first most frequent 1,000 words to the 5,000 most frequent words (K1~K5). The first 1,000 word level was introduced in response to research findings on lexical coverage and the relative value of words. The most frequent 1,000 word families were found to account for about 65%~85% of spoken and written English while the 2,000 word level provides coverage of only 3%~10% (Webb & Nation, 2017). The 4,000 word level was introduced on the assumption that five sequenced levels would give teachers, learners, and researchers a better insight into vocabulary learning progress. Conversely, the 10,000 word level was excluded on the basis that a wide range of

low frequency word levels is more suitable for vocabulary size tests. Academic words were also excluded on the grounds that their relative value varies significantly for learners. Items in the first AWL sub-list are likely to be encountered more often than words in the second sub-list. Therefore, Webb et al., (2017) argue that it might be more useful to assess learners' understanding of academic words at a particular frequency level than the AWL as a whole.

The second change concerns the source of the words. Test items were selected from the BNC/COCA lists, thus ensuring that frequency levels reflected current English. To prevent any bias, the True Random Number Generator at Random. Org was used. The quality of the selected clusters was further improved by examining responses from learners from different linguistic and cultural backgrounds and age groups. All target words and distractors within each cluster had the same part of speech and came from the same frequency level. With the exception of the first 1,000 word level, the definitions for the target items were composed of words from frequency levels higher than that being tested. This was to ensure that unfamiliar vocabulary does not affect users' ability to select correct responses.

Finally, some changes were also made to the test format, where the matching format was replaced with a more transparent grid format. The test items were presented in bold horizontally while the definitions were presented vertically. The paper version of the revised VLT and the answer key can be downloaded from Stuart

Webb's website <www.edu.uwo.ca/faculty-profiles/stuart-webb.html>. The website also includes a link to an electronic version of the test in which test takers are provided with the scores for each level and some advice on learning vocabulary.

With regard to interpretation of the test scores, Webb et al. (2017) suggest that, for K1~K3 frequency words, a cut-off point should be 29/30, while for 4000 and 5000 word levels the cut-off point can be 24/30. The difference is justified by the fact that the first 3000 words have the highest relative value as they account for the largest percentage of both written and spoken English. Therefore, learners should thoroughly master these words before they proceed to the next level.

Even though the VLT measures only receptive vocabulary knowledge, the test can provide useful information for teachers, learners, and programme administrators. Teachers and learners can identify possible lexical deficiencies and decide on the focus of subsequent learning. The results can be used for placement purposes as well as for setting individual learning goals. The test can also be used to evaluate learners' progress and the effectiveness of vocabulary teaching curricula within institutional programmes (Webb et al., 2017).

4.2 *Productive Vocabulary Levels Test (PVLT)*

A productive version of the VLT was developed by Laufer and Nation (1999). The test was designed to assess learners' *controlled productive*

ability, which refers to their ability to use L2 words when induced by a teacher or researcher. The test was modelled on Nation's (1983) receptive VLT and samples 18 items from five frequency levels (K2, K3, K5, K10, and UWL). The target items are embedded in the context of a meaningful sentence with the minimum number of initial letters provided to disambiguate the cues. The test takes a short time to complete and is easy to mark. One point is awarded for each correct answer, and the authors recommend ignoring minor spelling mistakes. The number of correct answers transformed into a percentage indicates the number of words known at each level. Like its receptive counterpart, the PVLT can be used for placement and diagnostic purposes. Three versions of the PVLT can be accessed online from Tom Cobb's *Compleat Lexical Tutor* website (www. lextutor.ca). Versions A and B match Laufer's and Nation's (1999) tests, while version C combines items from the A and B versions that are not cognate with French. The site also contains a link to Laufer's and Nation's (1999) paper, which includes two parallel paper versions of the test. The availability of two versions means that the test can be used as a pre-test/post-test measure of vocabulary growth, thus eliminating the possible effect of item memorization.

4.3　Vocabulary Size Test (VST)

The *Vocabulary Size Test* (VST) aims to measures learners' total receptive vocabulary size. The original version of the test was devised by Nation and Beglar (2007) to assess non-native speakers' knowledge of the 14,000 most frequent word families in English. Earlier studies

by Hu and Nation (2000) showed that unassisted comprehension requires 98% lexical coverage of the text. The vocabulary size needed to meet this level of coverage varies from genre to genre. Nation and Beglar (2007) suggested the following guidelines: 6,000 word families for children's movies, 7,000 word families for spoken English, 8,000 word families for reading newspapers, and 9,000 word families for reading novels. Therefore, data on learners' vocabulary size can help instructors predict how well learners might perform tasks such as reading a newspaper article or comprehending an informal conversation. The test scores can also be used to assess learners' progress and compare vocabulary development at L1 and L2.

The test measures knowledge of the first 14,000 BNC word families. It consists of 140 questions (ten from each 1,000 word level) and employs a multiple-choice format with four options for each question. The target words are presented in short sentences, each of which indicate a part of speech and eliminate possible homograph ambiguity but do not provide any clues about the word meaning. With the exception of the first 1,000 word level, where the target items and definitions come from the same frequency range, response options are written with vocabulary from the higher frequency ranges rather than the range of the word being tested.

While it may not be necessary for lower level learners to complete all fourteen sections of the tests, Nation and Beglar (2007) suggest that learners should attempt a few levels beyond their present level. This

is because words are not always acquired in line with their corpus frequency order and it is highly likely that learners will know some words from frequency ranges beyond their current level. Each item in the test is meant to represent 100 word families and learners' total vocabulary size is calculated by multiplying their test score by 100.

In 2015, Coxhead, Nation and Sim released an updated version of the VST, which retains the original test format but is expanded to measure knowledge of the 20,000 most frequent word families. The test consists of 100 items with five questions from each of the 20 frequency ranked lists generated from the BNC. Each list contains 1,000 word families. The wider frequency range means the test can be used to measure the vocabulary size of both native and nonnative speakers. In addition to the monolingual versions that were introduced, there are several bilingual versions in which the test items are given in English and the response options are provided in learners' L1. Currently available bilingual versions include Arabic, Gujarati, Korean, Japanese, Mandarin, Tamil, Thai, Russian, and Vietnamese. The original VST, two versions of the updated 20,000-word VST, and bilingual vocabulary size tests are accessible from Paul Nation's website ＜www.victoria. ac.nz/lals/about/staff/paul-nation＞.

4.4　Picture Vocabulary Size Test（PVST）

The *Picture Vocabulary Size Test*（PVST）developed by Laurence Anthony and Paul Nation（2017）is a discrete and selective spoken receptive vocabulary size test. It has been designed to measure the

vocabulary size of pre-literate children (native speakers aged five to eight and young non-native speakers) of up to 6,000 word families. The target words were selected from twelve 500-word lists created from a five million word corpus, which included books aimed at novice readers, texts from New Zealand School Journals, movies and TV programmes, and words from colloquial spoken British and American English. All of the first 2,000 words and 918 of the third 1,000 words from the BNC/COCA corpus appeared in the lists. The test consists of 96 multiple-choice questions. Each test word is provided aurally in a short non-defining sentence, which gives clues as to the sense of the word that is being tested and its part of speech. Vocabulary used in all context sentences was limited to the first 500 words. The response options consist of four pictures. An additional "I don't know option" can be activated in the test settings. The test normally takes about 15 minutes to complete although Anthony and Nation (2017) report that some children may take as long as 25 minutes. Because the test involves young learners, the authors stress that it is important they understand the test procedures. The test should be administered on a one-to-one basis, and an adult presence is crucial to ensure that test-takers complete the test and take it seriously. One correct answer corresponds to a vocabulary size of 62.5 words; therefore, the total vocabulary size is calculated by multiplying each test-taker's score by 62.5. Some potential weaknesses of the test may lie in the choice of images, the vocabulary size tested, and the dialect of the recordings. Not all the pictures used in the test are attractive to young children, which may affect their motivation. Furthermore, inferences need

to be made for some of the questions. For example, the image for *agenda* shows a meeting room, which means that test takers need to understand that meetings usually involve agendas. Furthermore, the test does not measure vocabulary size beyond 6,000 words or assess how well the words are known. The possibility that some responses may be nothing more than mere guesses cannot be excluded. Finally, the test words and the context sentences are spoken with a New Zealand accent, which may pose some difficulties for non-native test takers.

Nevertheless, in spite of its limitations, the PVST can be used for formative or diagnostic purposes, with estimated vocabulary size serving as a reference point for improvements in syllabus design, the selection or development of reading materials, and further vocabulary instruction. The test can also be used to compare young native and young intermediate non-native speakers' receptive spoken vocabulary size, providing valuable information about vocabulary growth at L1 and L2. The PVST can be downloaded from Laurence Anthony's homepage ＜www.laurenceanthony.net/software/pvst＞.

4.5　Guessing from Context Test (GCT)

Given the large number of words to be learned and limited classroom time, incidental learning from context is an important vocabulary learning strategy for second language learners. However, experimental data show that the ability to derive word meaning from context is not automatic and that, even at L1, language users benefit from strategy

training (Carnine, Kameenui & Coyle, 1984). The *Guessing from Context Test* (GCT) was therefore created and validated by Yosuke Sasao (2013a) as part of his PhD research at the Victoria University of Wellington. The GCT measures learners' ability to infer the meanings of unknown words from their context. The test is intended to be used as a diagnostic tool. It measures three aspects of the guessing strategy: (a) the ability to recognize the parts of speech of unknown words, (b) the ability to identify discourse clues, and (c) the ability to derive the correct meanings of unknown words. The three sub-skills are tested in separate sections and scored independently, making it possible to identify which aspect of the skill learners need to improve.

Each section consists of 20 questions. The use of pseudo words eliminates the possibility that test takers draw on prior word knowledge. In Section 1, which measures knowledge of parts of speech, the test items are presented in short sentences and test takers are asked to identify their grammatical class by choosing from four options: *noun, verb, adjective*, or *adverb*. In Section 2, the target words are presented in short passages that include the sentences from Section 1, and test takers are asked to choose the words or phrases that help them work out their meanings by selecting the correct answer from three options. Section 3 uses the same passages as Section 2 and asks test takers to guess the meanings of the target items by selecting the correct answer from three response options. The test, the answer key, and the list of contextual clues for Section 2 can be downloaded from Yosuke Sasao's website ＜http://ysasaojp.

info/testen.html＞.

4.6　*Word Part Levels Test（WPLT）*

Many English words are morphologically complex. According to Nation（2013）, the first 2,000 word families have as many as 13,205 inflected and derived forms, and affixation is also common at lower frequency ranges. Affix knowledge is considered an important component of vocabulary development. Knowledge of prefixes, roots, and suffixes can help learners decipher the meanings of new words or confirm the meanings of words they have tried to infer from context （e.g., Wei & Nation, 2013; White, Power, & White, 1989）. Therefore, determining how well learners know word parts can help teachers determine the quality of learners' vocabulary knowledge, predict their success in the acquisition of new words they encounter, and decide which affixes should be the focus of subsequent explicit instruction.

The *Word Part Levels Test*（WPLT）was also designed by Yosuke Sasao（2013b）as part of his PhD research project. The test measures written receptive knowledge of English word parts. The WPLT is targeted at three levels: beginners（40 word parts）, intermediate（39 word parts）, and advanced（39 word parts）. The 118 target word parts were selected by examining the inflectional and derivational forms of the 10,000 most frequent word families in English and identifying the affixes that appeared in more than one word family. Each level of the test measures three aspects of affix knowledge: recognition of affix forms, knowledge of affix meanings, and knowledge

of the syntactic properties （the use） of affixes.

In the form section, test takers are instructed to choose a word part, a group of letters that change the meaning, or the part of speech of a word. Each question has four options. This section is divided into two parts, the first focusing on prefixes and the second testing learners' knowledge of suffixes.

In the meaning section, each target affix is presented with two example words and test-takers are asked to select its meaning from four choices. The meanings of other randomly chosen affixes are used as distractors. In total, 73 affixes are tested across the three levels.

In the use section, each target word part is presented with two example words for which test takers are asked to identify the part of speech by selecting the correct answer from four options （noun, verb, adjective, or adverb）. A total of 56 word-class changing affixes （four prefixes and 52 suffixes） are tested across the three levels.

Each section is scored independently, which makes it easier for teachers to diagnose learners' weaknesses. In the instructions to test administrators, Sasao （2013b） suggests using a bar graph to report the results to learners so they can see what aspect of word part knowledge they need to focus upon. The rationale for the item selection and test format, and a discussion of the test validation process, can be found in Sasao and Webb's （2017） paper. The WPLT

instructions, the three levels of the test, the answer key, and the list of word parts can be downloaded from Sasao's website ＜http://ysasaojp. info/testen.html＞.

5．Conclusion

The resources introduced in this paper are only some of the tools available to facilitate the vocabulary development of EFL learners. The list is by no means exhaustive, and many other useful web-based applications and vocabulary learning sites are available. Nevertheless, it is hoped that this overview can provide some directions for teachers, learners, and new researchers regarding the tools that have been developed in recent years that are currently available as open learning resources. It is hoped that the resources reviewed in this paper will help teachers and learners to gain a better understanding of learning needs, set teaching /learning objectives, and monitor learning progress. Computer-based vocabulary learning tools such as flashcard software programs can also provide opportunities for learners to practice vocabulary outside the classroom in an efficient way. The websites introduced in this paper, such as Paul Nation's homepage ＜www. victoria.ac.nz./lals/about/staff/paul-nation＞ or Tom Cobb's *Compleat Lexical Tutor* ＜www.lextutor.ca＞, include many other useful, well-tested resources that can facilitate the development of L2 vocabulary and other skills. Finally, the resources reviewed in this paper will also be useful to researchers interested in L2 vocabulary acquisition and can serve as a springboard for the development of new technologies for vocabulary teaching, learning, and assessment.

Notes

1 . *The University Word List (UWL)*, created by Xue and Nation in 1984, is a predecessor of the AWL. It consists of 836 words not included in the GSL that are common in academic texts. According to Nation（1990）, the list covers 8% of the words in a typical academic text.

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