General and Academic Wordlists in English-Medium Instruction Programs

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English-medium instruction (EMI) is a growing trend in Japan, and one common challenge of EMI implementation is providing adequate language-proficiency preparation for students, including the development of general and academic vocabulary. This study used a corpus of approximately 500,000 words taken from reading texts used in EMI courses at one university in order to evaluate the New General Service List (NGSL) and the New Academic Word List (NAWL) as study tools for students in this university's program. Results showed that the NGSL provided 87.7% coverage of the corpus, a marked improvement over the original General Service List, which provided only 79.7% coverage. The NAWL performed less well, providing only an additional 3.0% coverage beyond that of the NGSL alone. Also, a full 17.4% of NAWL words did not appear in the corpus. This finding calls into question the value of the NAWL as a study tool for this program.

日本における英語による専門教育（EMI）は、増加傾向にある。EMIを実施する上で大学が取り組むべきことの一つは、学生の語学力強化であって、中でも語彙力強化が重要である。本稿では、ある大学のEMIコースで使用しているリーディングテキストから作成した約50万語のコーパスを使って、New General Service List（NGSL）とNew Academic Word List（NAWL）が当該プログラムの学生にとって適切な学習ツールであるかを調査した。その結果、NGSLは、コーパスのカバー率が87.7%で、初版のGeneral Service Listのカバー率79.7%から大きく改善されていることが分かった。NAWLの結果は、3.0%の上昇に留まった。また、NAWL単語の17.4%はコーパスに出現しなかった。このことから、当該プログラムに対するNAWLの活用価値への疑念が生じた。

Universities in Japan, along with higher education institutions around the world, are in the midst of a dramatic shift in the position of English in the curriculum. They are moving away from English as simply an object of instruction in language classes and towards the increasing use of English as the medium of instruction (EMI) in specialist content classes. In Japan, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has reported that as of 2015, there were 305 Japanese universities, more than 40% of the total number, offering undergraduate EMI courses; this is nearly double the number as compared to the turn of the 21st century (MEXT, 2017). Although it might be expected that these programs are intended to attract students from abroad, for most universities, undergraduate EMI programs predominately serve domestic students. In most cases, these programs are positioned as a supplement or complement to the Japanese-medium mainstream program and are commonly seen as a part of a university's internationalization-at-home or global *jinzai* strategy, which is intended to foster globally capable human resources (Brown, 2017a, 2017b).

Because EMI programs target domestic students, many universities face a challenge in helping those students prepare for the demands of studying in English, especially in the area of language proficiency. Few incoming undergraduate students meet the criteria for the Common European Framework of Reference level of B2, which has been identified as a threshold for EMI success (Breeze, 2014). Additionally, some critics of EMI such as Narita (2013) and Terashima (2009) have questioned whether these programs are a meaningful option for any domestic students other than an elite group. These critics often point to the limited listening and reading skills of undergraduates and question how much content knowledge such students are really able to learn in EMI classes. EMI students themselves sometimes worry about their language proficiency. Many report

struggling with the listening and reading required in EMI classes and feeling unprepared, having only taken high school English classes (Taguchi & Naganuma, 2006).

One aspect of students' language preparation for EMI is vocabulary development. Students have to develop a mastery of general and academic vocabulary as well as knowledge of discipline-specific terms. In this paper, we examine the value of two commonly used vocabulary study lists, the New General Service List (NGSL) and the New Academic Word List (NAWL), in the context of an EMI program in Japan.

Vocabulary Study and Wordlists

For students of English, acquiring a sufficiently large vocabulary can be a daunting task. There is essentially no end to the number of words a student might study, and there is no clear consensus on how many words constitute an adequate vocabulary size. Estimates of native speaker vocabulary size vary, but a vocabulary of 20,000 words is commonly cited as a conservative estimate (Zechmeister, Chronis, Cull, D'Anna, & Healy, 1995). Although this is clearly an unrealistic goal for all but the most ambitious and dedicated learners, it may not actually be necessary. Nation (2006) found that a vocabulary size of approximately 9,000 word families would allow for fluent reading of most general-purpose texts in English. So, if students cannot or do not need to learn all of the words known by a typical native speaker of English, the question becomes which of the many hundreds of thousands of possible vocabulary items would be most useful for students.

There have been several attempts to define the vocabulary that students of English should learn, mainly based on frequency (e.g., Laufer, 1992; Laufer & Ravenhorst-Kalovski, 2010; Nation, 2006). It is possible to study a corpus of English texts and determine which words are used most frequently. This kind of research can help identify which words are most useful to students. A wider corpus can be used for determining which words are more generally useful, and a narrower corpus can be used for making vocabulary lists for specific purposes. This study is focused on four vocabulary lists that seem to be particularly relevant to students in EMI contexts.

The first is the General Service List (GSL; West, 1953), which comprises 1,988 word families in frequent use in English. Over time, this list has become highly influential in language pedagogy, assessment, and research. As its name implies, the GSL was based on a wide corpus so as to identify words that would be useful in general situations. The second vocabulary list examined in the present study, the Academic Word List (AWL), was published in 2000 by Coxhead as a complement to the GSL. This list was based on a narrower corpus of academic texts; it is comprised of 570 word families that were frequently used in academic contexts but were not included in the GSL. Taken together,

the GSL and the AWL can be used to prepare students for both general and academic English (Nation, 2016).

One significant shortcoming of the GSL is simply that it is quite dated. The list was based on work carried out in the 1930s, and several of its constituents reflect that fact. Words such as *telegram* and *shilling* were then high-frequency words and were likely very useful for students at the time. However, one can question their value for students today. Also, high-frequency words that have come into use in recent decades, such as *digital* and *electronic*, are missing from the list. The dated nature of the GSL also contributes to a significant shortcoming of the AWL. The AWL is not entirely specific to academic contexts; it also contains a number of words better thought of as general vocabulary items. For example, the words *job* and *team* appear on the AWL even though they are not particularly academic in nature. However, because they do not appear on the dated GSL, they were included on the AWL (Gardner & Davies, 2013).

Another shortcoming of both the GSL and AWL is that they are based on word families. These lists are used under the assumption that knowledge of the headword facilitates at least receptive understanding of other members of the family, including inflected forms and transparent derivations. For example, if learners studied the headword *real*, it is assumed that they would have receptive understanding of related words such as *reality*, *realistic*, and *unrealistic*. For native speakers of English of high school age or older, there are indications that this is a safe assumption; knowledge of the headword does generally allow one to infer the meaning of other members of the family (Nagy, Diakidoy, & Anderson, 1993; Tyler & Nagy, 1989). However, there is reason to believe that second-language learners do not effectively transfer knowledge of the headword to understanding of the entire family (McLean, 2018; Mochizuki & Aizawa, 2000; Ward & Chuenjundaeng, 2009).

In an attempt to make up for the shortcomings of the earlier lists, two new vocabulary resources have been developed in recent years. Browne, Culligan, and Phillips (2013a, 2013b) developed the New General Service List and the New Academic Word List from larger, more modern corpora. The NGSL includes 2,801 entries covering the most frequently used words in English. The NAWL comprises 963 entries that are frequently used in academic texts but are not listed on the NGSL, and it is intended to be used in conjunction with the NGSL. The newer lists, the NGSL and NAWL, complement each other and are intended as replacements for the older lists.

By basing their lists on modern corpora, the developers of the NGSL and NAWL overcame the datedness issue of the GSL. These lists also address the shortcomings of using word families by using word groupings that require fewer assumptions about

learner knowledge. Specifically, they use the *modified lemma* as an organizing principle. A modified lemma is a group that includes a headword and all of its grammatical inflections regardless of part of speech. For instance, the modified lemma *power* includes both the nominal inflection *powers* as well as the verbal inflections *powers*, *powered*, and *powering*. This grouping requires two assumptions for the transferability of word knowledge. First, it is assumed that learners are able to transfer receptive understanding of a headword to comprehension of its grammatical inflections. This principle also assumes that the learner is able to understand the meaning of a headword in different parts of speech provided that the written form is the same. However, this principle does not assume that learners are able to transfer their knowledge of *power* to other members of the word family. As a result, the noun *power* and the adjective *powerful* appear as separate entries on the list, and learners would study them individually.

One way to assess the usefulness of a vocabulary list is to determine its coverage of texts that users would be likely to encounter. If a given text contains only words that are included on a vocabulary list, the list provides 100% coverage of that text. This is important because there is a direct relationship between the proportion of words in a text that are known to the reader and that reader's comprehension of the text (Schmitt, Jiang, & Grabe, 2011). So, vocabulary study lists that provide greater coverage of target texts are more valuable study tools.

Studies of the AWL have shown that it provides between 7% and 11% coverage of a variety of academic texts (Coxhead, 2011). The AWL and GSL used in conjunction provide approximately 86% coverage of academic texts (Coxhead, 2000). For the newer NGSL and NAWL, coverage has not yet been widely examined. In initial studies, the NGSL has given 4% to 6% better coverage of general English texts than the GSL (Browne, 2014; Stoeckel, in press); however, the NAWL has yet to be studied in terms of its coverage.

The Current Study

The current study is a comparison of the GSL and AWL with the NGSL and NAWL in terms of their coverage of a corpus of reading texts drawn from an EMI program at a small Japanese university (University N). At this institution, EMI is a complement to the mainstream Japanese-medium program. Students can take up to approximately 30% of their classes in English, though none of the EMI classes are required. The students in EMI classes are almost entirely Japanese students who graduated from domestic high school programs. This pattern of EMI implementation is typical of undergraduate EMI in Japan because such programs predominately serve domestic students and offer only a portion of the program in English (Brown, 2017a).

Before joining EMI classes, students complete a semi-intensive English for Academic Purposes (EAP) program as preparation. Vocabulary study based on mastery of the NGSL and NAWL is part of this EAP program. As such, the quality of these lists, as measured by coverage of EMI class texts, is of practical interest to program stakeholders. Therefore, the aim of this study is to answer the following interrelated research questions:

RQ1: Do the NGSL and NAWL provide better vocabulary coverage of a corpus of reading materials than the GSL and AWL in one EMI context?

RQ2: Are the NGSL and NAWL valuable pedagogical tools for EAP teachers working with the EMI students in this context?

Methodology

The four wordlists used in this study were the versions of the General Service List and the Academic Word List available with the AntWordProfiler software (Anthony, 2014), version 1.01 of the New General Service List, and version 1.0 of the New Academic Word List (Browne et al., 2013a, 2013b). The vocabulary coverage of each of these lists was determined through analysis of a corpus of reading texts taken from EMI courses taught at University N. Texts were collected from 11 courses in international relations, political science, and applied linguistics (see Table 1). They mainly included authentic materials intended for undergraduate native English speakers (82.75% of the total number of tokens), as well as some materials adapted by faculty members in consideration of the language proficiency of the learners (17.25%). This convenience sample represented all reading texts used in approximately one third of University N's available EMI courses. The total size of the corpus was 500,474 tokens.

Table 1. Overview of the EMI Corpus

Discipline	Number of courses	Tokens
Applied linguistics	5	196,479
International relations	5	266,148
Political science	1	37,847
Total	11	500,474

The print materials collected for the corpus were scanned, checked for errors, and converted to a digital format. Reading materials from each course were combined into a single file. The following elements that were not in the main body of the texts were removed from the corpus at this stage: tables of contents, reference lists, page numbers, indexes, author biographies, and publisher and copyright information. Similarly, some elements of the main text that were not part of the regular discourse were removed. These included data tables, charts and figures, mathematical formulae, and non-English words used as examples in linguistics texts. Proper nouns (i.e., names of people and places) were retained in the corpus, but they were identified with the part-of-speech tagger available in the WMatrix set of corpus analysis tools (Rayson, 2008) so that they could be dealt with separately in the data analysis. The files for each course were analyzed using the AntWordProfiler software (Anthony, 2014) in order to determine the vocabulary coverage provided by the GSL, AWL, NGSL, and NAWL.

Results

Table 2 displays the coverage of the corpus provided by the GSL, AWL, NGSL, and NAWL. Throughout the corpus, the NGSL provided much greater coverage than the GSL. Looking at the corpus as a whole, the NGSL provided 87.66% coverage compared to 79.74% for the older GSL, a 7.92% difference in favor of the newer list. However, a different pattern emerged in coverage provided by the academic lists. The AWL provided 10.05% coverage of the corpus, and the NAWL gave only 3.04%. This is a difference of 7.01% in favor of the older list. As a pair, the GSL and AWL provided 89.79% coverage, compared to 90.70% for the NGSL and NAWL pair. This 0.91% difference in favor of the newer lists represents only a small improvement.

Table 2 also shows that the coverage was not uniform throughout the corpus. The newer lists, the NGSL and NAWL pair, performed better in coverage of texts from all three domains (applied linguistics, international relations, and political science). However, the difference in coverage provided between the newer and older lists was largest in the domain of international relations.

Discussion

The first research question compared the coverage of a corpus of EMI reading materials provided by the newer NGSL and NAWL against that of the older GSL and AWL. The results were mixed. The NGSL clearly outperformed the GSL, providing 7.92% higher coverage. The difference was particularly evident in political science, where the NGSL outperformed the GSL by 11.00%.

At the same time, the data also indicated that the NAWL underperformed the AWL by 7.01%. From this, one could infer that the older AWL is superior to the NAWL in this context; however, the bulk of the difference in coverage between the two lists was made up of words that are on the NGSL. As proportions of the corpus coverage provided by the AWL, 82.29% of the words were also on the NGSL, and 11.12% were on the NAWL. Only 6.6% of the words did not appear on either the NGSL or NAWL. So, if viewed alone, the AWL appears to be a superior list; however, when viewing the academic vocabulary lists for their intended purpose, as complements to their general vocabulary counterparts, the newer lists actually held a small advantage.

This brings us to the second research question, the pedagogical value of the two newer lists, the NGSL and NAWL. For the NGSL, the results are clear. The NGSL represented a substantial improvement over the GSL and provided students with 87.66% coverage of

Table 2. Vocabulary Coverage (%) of the EMI Materials Corpus by Target Wordlists

Domain	Proper nouns	General vocabulary			Academic vocabulary			General & academic		
		GSL	NGSL	Diff.	AWL	NAWL	Diff.	GSL & AWL	NGSL & NAWL	Diff.
Applied linguistics	1.63	82.38	88.44	6.06	8.99	3.35	-5.64	91.37	91.79	0.42
International relations	3.13	78.56	87.42	8.86	10.29	2.75	-7.54	88.85	90.17	1.32
Political science	3.06	74.25	85.25	11.00	13.83	3.43	-10.40	88.08	88.68	0.60
Whole corpus	2.53	79.74	87.66	7.92	10.05	3.04	-7.01	89.79	90.70	0.91

texts that they would encounter in EMI classes. In fact, the NGSL alone provided almost as much coverage as the two older lists combined. Investing time and energy so that students master the NGSL is a sound pedagogical decision.

For the NAWL, the results were less clear. The additional 3.04% coverage that the NAWL provided as a complement to the NGSL is valuable, owing to the close relationship between text coverage and comprehension. It is not certain, though, whether mastery of the entire list would be an appropriate goal for the students in this EMI context, because 168 NAWL words, a full 17.45% of the entire list, did not appear in the corpus at all. Based on the results of this study, it is difficult to justify the learning burden of the NAWL and recommend it as a pedagogical tool for students in this EMI context.

However, is the limited coverage provided by the NAWL a weakness of the list itself, or does it reflect the diverse nature of academic English? Some vocabulary researchers doubt whether a general list of academic vocabulary, such as the NAWL, is even possible, given the wide variety of disciplines it would have to cover. Instead, they advocate discipline-specific wordlists to aid students in their particular fields of study (Hyland & Tse, 2007). Although this issue has been debated (e.g., Gardner & Davies, 2013), the limited coverage provided by the NAWL in the present study may simply have been unavoidable because of the quality of coverage provided by the NGSL.

Before drawing conclusions, however, it is important to consider the limitations of this study. The main limitation is the size and scope of the corpus. With just over 500,000 words, the corpus is not large enough to make strong claims. Also, this corpus was built from texts representing a limited number of EMI courses at the university under study (approximately one third of all EMI offerings). So, until the corpus is expanded, the claims made in this study should be considered somewhat tentative. Additionally, as the corpus was comprised of texts used at just one university, caution should be exercised before generalizing the findings to other settings.

Looking to the future, this study has the potential to open new avenues of research. One would be to investigate the extent to which vocabulary coverage is affected by simplifying materials to accommodate learner proficiency, as some teachers did for courses examined in this study. Another avenue would be to consider alternatives to general-purpose academic wordlists in particular EMI programs. One possibility is to use existing discipline-specific wordlists (for a review, see Youngblood & Folse, 2017), but there are many disciplines for which corpus-derived specialized lists have yet to be developed. Moreover, the extent to which existing lists are suitable for EMI contexts in Japan is as yet unknown. Therefore, further research using an expanded corpus of EMI

materials from the Japanese context could enable the evaluation of existing discipline-specific lists and allow the development of vocabulary study lists in other disciplines. This would give students a more focused way to invest their limited study time.

Conclusion

This study used a corpus of reading materials from English-medium instruction courses at one university in Japan to study the New General Service List and the New Academic Word List. Results indicate that the NGSL is a clear improvement on the older General Service List and should be recommended as a study tool for students in EMI contexts. However, the NAWL is less valuable, and students may be better off investing their time in studying discipline-specific vocabulary in order to prepare for the demands of EMI.

Bio Data

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