# Nurturing Academic Vocabulary Knowledge Growth with Learner-Inspired Materials

# Paul Mathieson (Nara Medical University) Claire Murray (Nara Medical University)

#### Abstract

Having knowledge of the meaning and appropriate use of academic vocabulary can be crucial in learners' academic success. However, finding or creating materials to assist academic vocabulary learning that are at an appropriate level and that also stimulate ESL/EFL learners can be a tremendous challenge for teachers. This paper examines the development of a learner-inspired, fictional graded reader series that incorporates (and systematically recycles) all of Coxhead's (2000) Academic Word List items. Its implementation in a Japanese medical university EAP course resulted in positive feedback from learners and also substantial academic vocabulary knowledge growth. And despite the potential for generative AI to develop similar learning materials, our experiment using ChatGPT (with a variety of prompt configurations) revealed that it was not able to successfully produce similarly graded reading materials. Thus, teachers may still have an important role as moderators in managing generative AI's output of learning materials.

学術的な語彙の意味と適切な使用法に関する知識を持つことは、学習者の学業における成功に極めて重要である。しかし、適切なレベルの学術的な語彙学習を支援し、ESL/EFL学習者を刺激する教材を見つけたり、作ったりすることは、教師にとって非常に困難なことである。この論文では、Coxhead

(2000) の Academic Word List の全項目を取り入れた(そして体系的に再利用した)、学習者の発想を取り入れた架空のグレーデッドリーダーシリーズの開発について検討した。日本の医療系大学の EAP コースに導入したところ、学習者から好意的なフィードバックが得られ、また学術的な語彙の知識も大幅に増加した。また、生成 AI が同様の学習教材を開発できる可能性があるにもかかわらず、ChatGPT を使用した実験(様々なプロンプトの設定)では、同様の評定付きリーディング教材をうまく作成できないことが明らかになった。したがって、教師は、生成 AI が出力する学習教材を管理する上で、モデレーターとして重要な役割を担っている可能性がある。

#### Introduction

Despite the undoubted importance of teachers devoting class and course time to vocabulary teaching, learners do most of their vocabulary learning autonomously (and much of it outside of class time). In line with this, research has shown that for both L1 learners (Nagy et al., 1985; Krashen, 1989) and L2 learners (Day et al., 1991; Dupuy & Krashen, 1993; Horst et al., 1998; Pigada & Schmitt, 2006; Waring & Takaki, 2003), a large proportion of their vocabulary learning occurs incidentally through reading. And the omnipresence of smartphones and tablets means that language learners now have seemingly limitless opportunities to be exposed to reading materials that can potentially stimulate and support their L2 vocabulary learning. Yet the quality, accuracy, and appropriateness of such materials for learners' language learning needs is far from guaranteed.

Given all of these factors, L2 language teachers need to try to find or create opportunities for L2 learners – and particularly those in English as a foreign language (EFL) contexts – to be exposed to a much larger volume of language learning input (Webb, 2020). From a vocabulary learning

perspective, materials that capture students' interest are (unsurprisingly) correlated with increases in incidental vocabulary acquisition through reading (Huckin & Coady, 1999). However, for busy language teachers, finding the time, energy, and motivation to source or to develop materials that simultaneously facilitate language learning and engage/interest their students can be an enormous challenge. This can be particularly so for teachers in English for academic purposes (EAP) contexts. Although materials that include academic vocabulary abound (journal papers, Ted Talks, and so on), many of these materials are not pitched at the right English proficiency level, do not contain sufficient breadth and frequency of academic vocabulary, or do not align with students' interests.

This paper addresses the development and implementation (in an EFL/EAP context) of a fictional graded reader series that was designed to address these issues. The graded reader series – *My Mysterious Friend Sora* (*The AWL Readers*) (Mathieson, 2021) – follows the adventures of a fictional Japanese medical student and her unusual friend. The series is targeted at intermediate-level (CEFR B1-B2) learners, and includes systematic recycling of all 570 items in Coxhead's (2000) Academic Word List (AWL). In this paper, we discuss how academic vocabulary is conceptualised, and why we consider it is important for learners studying in EAP contexts. From there, we outline the learning context which gave rise to the creation of *The AWL Readers* (as they will hereafter be referred to), and then explain the development and intended use of *The AWL Readers*. In the final part of our paper, we explore some of the potential benefits and pitfalls of using generative AI to assist with developing similar materials to support academic vocabulary learning.

# The Nature, Scope, and Importance of Academic Vocabulary

### Academic Vocabulary and Academic Word Lists

Nation's (2001) seminal work on second language vocabulary learning divided vocabulary according to frequency and type. Concerning frequency, vocabulary can be divided into high-frequency, mid-frequency, and low-frequency words. High-frequency words are the words most frequently found in all texts and thus are the most important words to learn when starting to learn a second language. Accordingly, many lists of high-frequency English words have been compiled: the General Service List (West, 1953) and the New General Service List (Browne et al., 2013a) being two well-known lists. High-frequency words are the first 3,000 word families of the British National Corpus (BNC) and the Corpus of Contemporary American English (COCA), mid-frequency words are the fourth to ninth 1,000 words, and low-frequency words are the tenth-1,000 words and beyond (Nation, 2022).

Regarding type of vocabulary, Nation (2001, 2022) found that certain vocabulary items occurred more frequently in academic texts than in general texts, and catorgorised them as technical words and academic words. Technical words are discipline-specific and are thought to constitute about 5% of an academic text (Nation, 2022). They are reasonably common in a particular field, but uncommon elsewhere, and tend to be low-frequency words. Academic words are the words that are common across academic disciplines, and make up between 10-14% of words in any academic text (Coxhead, 2000; Gardner & Davies, 2014). The remaining vocabulary in academic texts (81-85% of words) is high-frequency general vocabulary.

There are many compilations of academic vocabulary, including the

Academic Word List (AWL) (Coxhead, 2000), the New Academic Word List (NAWL) (Browne et al., 2013b), and the Academic Vocabulary List (AVL) (Gardner & Davies, 2014). The AWL (Coxhead, 2000) was designed as an extension of the GSL (West, 1953), and it assumes knowledge of the GSL's 2,000 high frequency word families. The AWL is organised around word families and consists of 570 headwords. The 963-headword NAWL (Browne et al., 2013b) was created as an extension of the NGSL (Browne et al., 2013a) and consists of inflected forms of words (flemmas) rather than word families. The AVL (Gardner & Davies, 2014) is derived from the COCA and is organised around lemmas instead of word families, and consists of 3,000 lemmas. The AVL does not assume knowledge of high-frequency words and so contains more high-frequency words than the AWL and the NAWL.

## The Importance of Academic Vocabulary

Learning academic vocabulary is important for EAP students for a number of reasons. First, many studies show the impact of vocabulary knowledge on academic success. Vocabulary knowledge in general has been found to be a strong predictor of many aspects of EFL university students' academic performance, including listening comprehension (Staehr, 2009), academic writing (Mollet et al., 2010), reading comprehension (Trenkic & Warmington, 2019) and overall academic achievement (Daller & Phelan, 2013; Daller & Xue, 2009). Furthermore, academic vocabulary knowledge has been linked to success in language testing such as IELTS and TOEFL (Daller & Xue, 2009) and in academic grades (Masrai & Milton, 2018; Morris & Cobb, 2004).

Second, EAP students need to know academic vocabulary to engage with academic texts. As previously stated, 10%-14% of written academic texts

comprise academic vocabulary (Coxhead, 2000; Gardner & Davies, 2014), and EAP students therefore encounter many academic words across a wide range of texts. Moreover, as English is the lingua franca of academia (Mauranen et al., 2016), academic vocabulary knowledge is essential for EAP students to read and write academic articles. This is especially so for medical students as more than 90% of indexed scientific articles have been published in English (Di Bitetti & Ferreras, 2017). Thus, teaching academic vocabulary to EAP students in general and medical students in particular seems to be a worthwhile pursuit.

## **Teaching and Learning Context**

The students at the first author's institution (a public medical university) are Japanese medical students, and the focus of this paper is on first-year medical students' academic vocabulary learning. As part of their compulsory EAP class, first-year medical students are required to learn all 570 words in Coxhead's (2000) AWL. At the commencement of their EAP course, first-year medical students take Webb et al.'s (2017) Updated Vocabulary Levels Test (UVLT). Previous UVLT results conducted at the first author's institution show that approximately 80% of our students have attained receptive mastery of words up to and including the 4,000-word level of the BNC/COCA lists. However, at the 5,000-word level, only roughly 33% of students have achieved receptive mastery. Given that 96 AWL headwords are over the 4,000-word level, learning AWL words seemed like a logical next step for our students to improve their English vocabulary.

Furthermore, the UVLT only tests students' receptive knowledge of vocabulary. And studies have shown that learners' receptive knowledge is larger than their productive knowledge and that the difference between

receptive and productive vocabulary increased as the frequency of the words decreased for both general vocabulary (Laufer, 1998; Webb, 2008) and academic vocabulary (Zhou, 2010). Therefore, although our students have demonstrated receptive mastery of the first 4,000 words, the 319 AWL headwords in the 3,000-word level and the 154 headwords in the first 2,000 word level offer an excellent opportunity for our students to improve their productive knowledge of lower frequency words.

The AWL consists of 570 words divided into 10 sublists in descending order of frequency. Sublist 1 contains the 60 most frequently used academic words, and so on, until sublist 10 which contains the 30 least frequently used academic words (Coxhead, 2000). Over a period of 10 weeks, students at the first author's institution study one AWL sublist per week. Each week, students are tested on their written, productive knowledge of AWL words in the relevant sublist. Students are tested on 10 headwords (chosen at random) from that week's sublist, and are required to write grammatical sentences that show the correct meaning of the AWL headword. At the end of the EAP course, students are required to pass three summative AWL tests (of the same style as the weekly tests) with a score of 80% or higher. These summative AWL tests include 10 randomly selected AWL words taken from all 10 AWL sublists (that is, one word from each sublist). Failure to pass three of these summative AWL tests means that the student fails their EAP course. In addition, if students at the first author's institution fail any course during an academic year, they are required to repeat that academic year in its entirety. Thus, learning these AWL vocabulary items carries very highstakes for our students.

## The Development and Use of The AWL Readers

### The Development Phase

#### Information Gathering and Story Planning

The development of *The AWL Readers* began as a response to the high-stakes nature of academic vocabulary testing at the first author's institution. The need to pass summative AWL tests to progress with their medical degree understandably causes tremendous stress for our students. Moreover, given that these summative AWL tests require students to produce grammatically and semantically correct sentences using AWL words, most students tend to focus on memorisation of sample sentences – primarily via sentence lists (Mathieson & Bolstad, 2020). The unfortunate knock-on effect of this is that many of our learners fail to acquire deeper knowledge of AWL words (learning different meaning senses, collocations, and so on). Accordingly, the first author began to explore ways to make academic vocabulary learning more engaging and more meaningful for our learners. This resulted in the idea of developing a graded reader series that includes all of the AWL words in the context of a story set at a fictional medical university.

To add authenticity to the story, the first author used various student sources for ideas and inspiration during the development phase. One of the principal sources of information about our learners' lives is learner diaries. As part of their EAP course, our first-year medical students must write five 100-word diary entries in English per week. These learner diaries not only provide teachers with a window into students' daily lives, but they also give teachers access to their students' thought processes, goals, and desires. In order to glean more information about student life beyond the first-year

level, the first author also conducted interviews with some third-, fourth-, and fifth-year medical students.

After gathering a substantial amount of information about on-campus medical student life (class and year structure, club activities, and so on) and off-campus life (part-time jobs, research placements, holiday activities, and so on), the first author created a broad outline for the story. Because our learners study each of the ten AWL sublists sequentially, the first author decided to include ten volumes in *The AWL Readers* series (one volume for each AWL sublist).

### The Writing Process

In addition to trying to make the story interesting and relevant for our students, one of the goals throughout the writing and editing process was ensuring that the English level of The AWL Readers aligned with that of the majority of our students. In order for a text to be comprehensible, between 95% to 98% of the words should be known to the reader (Hu & Nation, 2000; Qian, 1999; Schmitt et al., 2011). From a text readability and comprehension perspective, our students' UVLT results (with the majority attaining mastery up to the 4,000 word level) were important in terms of controlling the vocabulary coverage in The AWL Readers. Thus, with the assistance of the second author and one other external editor, the first author attempted to ensure that the books would be accessible not only for our medical students, but also for other students at the B1 to B2 CEFR levels. Between 95% and 98% of the vocabulary across all 10 volumes of The AWL Readers lay within the first four 1,000 word levels in Nation's (2017) BNC/COCA word family list. Table 1 below shows the frequencies of words within each of the first five 1,000 word levels and the number of running words for each volume.

Table 1
Vocabulary Coverage Rates in The AWL Readers

Book Number	Running	K1	K1-K2	K1-K3	K1-K4	K1-K5
	Words*	IX I				
1	6,642	90.1%	95.9%	98.1%	98.6%	98.9%
2	5,935	88.6%	94.3%	96.9%	97.3%	97.7%
3	7,437	89.3%	95.3%	97.9%	98.5%	98.9%
4	6,820	89.3%	95.7%	98.2%	98.8%	99.2%
5	7,338	88.6%	94.1%	97.4%	97.9%	98.2%
6	8,959	87%	92.4%	95.7%	96.2%	96.5%
7	8,330	87%	94.5%	97.6%	98.4%	98.9%
8	8,184	88.2%	94.2%	96.9%	97.8%	98.1%
9	9,250	89.5%	95.1%	97.2%	98.6%	99%
10	10,995	89.7%	95.2%	97.5%	98.6%	99.1%

<sup>\*</sup> The total number of running words in *The AWL Readers* is 79,850 words.

One of the most challenging aspects of the writing process was ensuring that all 570 AWL vocabulary items were included throughout the series. As we highlighted above, each volume in *The AWL Readers* aligns with one AWL sublist. Thus, Book 1 of *The AWL Readers* includes all 60 items in AWL Sublist 1, Book 2 includes all 60 AWL Sublist 2 items, and so on. However, in order to ensure that readers encountered AWL words more than once throughout the series, all AWL items from the preceding AWL sublist are also recycled in the next book in the series. For example, Book 7 includes all AWL Sublist 7 words as well as further occurrences of all AWL Sublist 6 words. Therefore, all AWL words are used at least twice in *The AWL Readers*, and there are 2,904 instances of AWL word families being used throughout the series. One final point of note regarding the inclusion of AWL words concerns the spacing of occurrences. In deciding when, where, and how to use AWL words in the story, the first author aimed to ensure that readers

had sufficient attention drawn to each target AWL word. With this in mind, the first author avoided using multiple target words in one sentence, and also tried to space out the uses of target AWL words evenly throughout each book in the series

### The Use of The AWL Readers - for Medical Students and Beyond

Although *The AWL Readers* were written with a specific group of learners in mind, because the target audience are intermediate-level EFL learners, they could easily be used in other similar (non-medical) contexts. Our learners study the AWL in sequence (Sublist 1 in week 1 of the EAP course, Sublist 2 in week 2, and so on). For this reason, when we included the books in our EAP programme as part of a study about academic vocabulary learning (Mathieson & Sasao, 2024), students read each volume of the series in line with the particular AWL sublist that they were studying and being tested on. Thus, for any other practitioners who are teaching academic vocabulary and who might consider utilising *The AWL Readers*, we recommend either having students read the books in sequence with the AWL sublists, or else within close proximity of learning the respective sublist items in the AWL.

For the purposes of our wider study, we made both physical and digital versions of *The AWL Readers* available to our learners. Furthermore, the books are also now available in the Xreading virtual library (www. xreading.com). It is perhaps interesting to note that despite a recent report suggesting that Japanese elementary, junior high school, and high school learners tend to prefer physical books over ebooks ("Poll: Students prefer to read physical books", 2023), the majority of the feedback we received from our learners indicated a preference for reading digital versions of *The AWL Readers* (on tablets, smartphones, and so on). One of the main reasons

that our learners mentioned for this was the ease and convenience of reading the books in a digital format, meaning that they could read them almost anywhere. Furthermore, a number of students highlighted the fact that they could more easily check the meaning of unknown or unfamiliar words in the digital format.

A final important point about our learners' use of *The AWL Readers* concerns their effectiveness for supporting academic vocabulary learning. The results of our wider study (Mathieson & Sasao, 2024) emphasised the important role that reading comprehensible text plays in L2 incidental vocabulary learning (Cobb, 2007; Horst, 2005; Nation & Wang, 1999, Waring & Takaki, 2003; Webb & Chang, 2015). In the depth of academic word knowledge tests (pretest, post-test, and delayed post-test) that we developed for that study, learners who read The AWL Readers outperformed learners who did not have access to The AWL Readers in every aspect of word knowledge that we measured (productive knowledge of semantic meaning and grammatical usage, receptive knowledge of collocations, receptive knowledge of synonyms, and receptive knowledge of L1 meaning). And in numerous areas of academic word knowledge (particularly in the delayed post-test), this higher level of academic word knowledge reached the level of statistical significance. Taken together with the positive feedback that we received from our learners about the story, the characters, and the readability of the books, these findings suggest that there is value in using The AWL Readers to support learners' academic vocabulary learning.

# Academic Vocabulary Learning Materials Development and the Role of AI

A considerable amount of attention has been devoted to explaining the circumstances that led to the development of *The AWL Readers* in this paper.

This included what we consider to be three important aspects connected with academic vocabulary learning that we believe have been absent or lacking in other academic vocabulary learning materials. These three aspects envisage materials that (1) include a suitable breadth and volume of target academic vocabulary, (2) are aimed at the right proficiency level, and (3) stimulate learners' interest. Based upon what we have discussed herein, we consider that *The AWL Readers* have adequately addressed these issues. However, with the recent advent of numerous generative AI applications, both teachers and students now have the potential to create their own materials to facilitate academic vocabulary growth. Yet despite its undoubted creative and educational potential, concerns remain about the hidden biases and limitations of generative AI (Baidoo-Anu & Ansah, 2023).

In order to explore the potential of generative AI in developing materials for supporting academic vocabulary learning, we conducted an experiment using ChatGPT (OpenAI, 2023). We used the free version of ChatGPT (Version 3.5) rather than the paid version (ChatGPT Plus) because we believed that both teachers and students alike would be more likely to use the freely available version, and we wanted to examine its potential for creating viable vocabulary learning materials. Specifically, we wanted to determine whether ChatGPT could create a fictional story that included AWL words and that was aimed at EFL learners. With these goals in mind, the first author created prompts using ChatGPT in order to see if it could create a similar text to the first part of The AWL Readers - and crucially, a text that was graded in a similar way (CEFR B1-B2 level) and that also included the same target AWL words. In order to try to ensure that the ChatGPT-created text matched the vocabulary level of *The AWL Readers*, the first author requested that ChatGPT limit the vocabulary to the first 3,000 words in the BNC/COCA database. The text of the first author's prompt is included in Appendix A.

Before we evaluate ChatGPT's output, we invite readers to refer to Appendix B, where we have included both the ChatGPT output and the relevant excerpt from *The AWL Readers*. As can be seen, both texts follow a similar narrative structure. Furthermore, both texts include the same (and the same number of) target AWL words, which are indicated in bold. Text 2 in Appendix B is the human-created graded text, and Text 1 was created by ChatGPT. Although ChatGPT met the narrative and AWL vocabulary-related requirements set out in the first author's prompt (Appendix A), it is highly questionable whether ChatGPT's output is sufficiently graded for intermediate-level EFL/ESL learners. Table 2 below shows the vocabulary coverage of the ChatGPT-created output using Tom Cobb's Compleat Lexical Tutor (Lextutor) tool (Cobb, n.d.).

Table 2

Lextutor BNC/COCA Vocabulary Profile for the ChatGPT-Created Text

Frequency	Word	Types (9/)	Tokens (%)	Cumulative
Level*	Families (%)	Types (%)	Tokens (%)	Token (%)
K1	64 (50.0)	68 (51.13)	158 (69.0)	69.0
K2	23 (18.0)	23 (17.29)	27 (11.8)	80.8
КЗ	18 (14.1)	18 (13.53)	20 (8.7)	89.5
K4	6 (4.7)	7 (5.26)	7 (3.1)	92.6
K5	4 (3.1)	4 (3.01)	4 (1.7)	94.3
К6	4 (3.1)	4 (3.01)	4 (1.7)	96.0
K7	5 (3.9)	5 (3.76)	5 (2.2)	98.2
K8	2 (1.6)	2 (1.5)	2 (0.9)	99.1
K12	1 (0.8)	1 (0.75)	1 (0.4)	99.5
K14	1 (0.8)	1 (0.75)	1 (0.4)	99.9

<sup>\*</sup> Off-list words (7 types, 17 tokens) were excluded from this analysis. As we noted earlier, research has shown that the proportion of words that

should be known for a text to be comprehensible is 95% to 98% – with Nation (2022) noting that many researchers emphasise the higher (98%) threshold. In the case of the ChatGPT-created text, Table 2 indicates that the lower (95%) standard is only reached at the K6 level, while the higher threshold (98%) is only attained at the K7 level. And despite requesting that ChatGPT include only words up to the 3K level (excluding the target AWL words), this stipulation was not adhered to by ChatGPT. In particular, some 10.5% of words used in the ChatGPT text were situated above the K3 level – and none of these were AWL words. This means that such a text would be considerably burdensome for all but the most advanced EFL/ESL learners to read.

It is also worth adding that the first author tried around 20 or so different prompt configurations to determine if different prompt wording might produce more effectively graded outputs. This included prompts with web links to the BNC/COCA (first 3,000 words) list, as well as prompts asking ChatGPT to include only words within the GSL (West, 1953) and the NGSL (Browne et al, 2013a). However, for all of the different prompt configurations, ChatGPT produced similarly dense texts containing a considerable number of low-frequency vocabulary items. Accordingly, though the extent of generative AI's creative potential appears boundless, there still appear to be some blind spots in terms of its ability to create effective EFL/ESL learning materials. This suggests that teachers in EFL/ESL contexts still arguably (thankfully?) have an important role to play in both developing and adapting graded reading materials for their learners.

#### Conclusion

Although there is an abundance of graded reading, listening, and viewing

materials for general English purposes, there is undoubtedly more room for growth in terms of developing similarly graded materials for learners in EAP and ESP contexts. The creation of The AWL Readers (Mathieson, 2021) represents an attempt to address this by providing an accessible, comprehensible story that includes multiple instances of all of Coxhead's (2000) AWL words. It is hoped that it can be a stimulating and effective resource to support deliberate learning of academic vocabulary by learners in a range of EAP contexts. Yet there is still so much more that can be done - particularly in the vital area of ESP materials creation. As more EFL/ESL students seek materials that align with their current or future academic and/or occupational interests, teachers need to rise to the challenge by helping to facilitate access to such materials. This process can be both aided and supplemented through the use of ChatGPT and other similar generative AI platforms. However, as we have shown, both teachers and students need to be aware of the limitations of over-reliance on this burgeoning AI technology. For when it comes to creating, revising, and assessing graded reading materials, there is still - for now, at least - room for teacher intuition and know-how to shine.

#### References

- Baidoo-Anu, D., & Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): Understanding the potential benefits of ChatGPT in promoting teaching and learning. *Journal of AI*, 7(1), 52–62.
- Browne, C., Culligan, B., & Phillips, J. (2013a). *The New General Service List*. http://www.newgeneralservicelist.org.
- Browne, C., Culligan, B., & Phillips, J. (2013b). *The New Academic Word List*. http://www.newgeneralservicelist.org.

- Cobb, T. (n.d.). *Compleat Web VP v.2.6* [computer program]. Accessed 21 November, 2023 at https://www.lextutor.ca/vp/comp/.
- Cobb, T. (2007). Computing the vocabulary demands of L2 reading. Language Learning & Technology, 11(3), 38–63.
- Coxhead, A. (2000). A new academic word list. *TESOL Quarterly*, 34(2), 213–238.
- Daller, M. H., & Phelan, D. (2013). Predicting international student study success. *Applied Linguistics Review*, 4(1), 173–193.
- Daller, M. H., & Xue, H. (2009). Vocabulary knowledge and academic success: A study of Chinese students in UK higher education. In B. Richards, M. H. Daller, D. D. Malvern, P. Meara, J. Milton, & J. Treffers-Daller (Eds.), *Vocabulary studies in first and second language acquisition* (pp. 179–193). Palgrave Macmillan.
- Day, R. R., Omura, C., & Hiramatsu, M. (1991). Incidental EFL vocabulary learning and reading. *Reading in a Foreign Language*, 7(2), 541–551.
- Di Bitetti, M. S., & Ferreras, J. A. (2017). Publish (in English) or perish: The effect on citation rate of using languages other than English in scientific publications. *Ambio*, 46(1), 121–127.
- Dupuy, B., & Krashen, S. D. (1993). Incidental vocabulary acquisition in French as a foreign language. *Applied Language Learning*, *4*, 55–63.
- Gardner, D., & Davies, M. (2014). A new academic vocabulary list. *Applied Linguistics*, *35*(3), 305–327.
- Horst, M. (2005). Learning L2 vocabulary through extensive reading: A measurement study. *Canadian Modern Language Review*, 61(3), 355–382.
- Horst, M., Cobb, T., Cobb, T., & Meara, P. (1998). Beyond A Clockwork Orange: Acquiring second language vocabulary through reading. *Reading* in a Foreign Language, 11(2), 207–223.

- Hu, M., & Nation, I. S. P. (2000). Vocabulary density and reading comprehension. *Reading in a Foreign Language*, *13*(1), 403–430.
- Huckin, T., & Coady, J. (1999). Incidental vocabulary acquisition in a second language: A review. *Studies in Second Language Acquisition*, *21*(2), 181–193.
- Krashen, S. (1989). We acquire vocabulary and spelling by reading: Additional evidence for the input hypothesis. *The Modern Language Journal*, 73(4), 440–464
- Laufer, B. (1998). The development of passive and active vocabulary in a second language: Same or different? *Applied Linguistics*, 19(2), 255–271.
- Masrai, A., & Milton, J. (2018). Measuring the contribution of academic and general vocabulary knowledge to learners's academic achievement. *Journal of English for Academic Purposes*, *31*, 44–57.
- Mathieson, P. (2021). My Mysterious Friend Sora (The AWL Readers). Xreading VL.
- Mathieson, P., & Bolstad, F. (2020). A spoonful of humour helps the medicine go down: Enlivening academic English vocabulary learning in a medical English course. *The Asian ESP Journal*, *16*(3), 64–87.
- Mathieson, P., & Sasao, Y. (2024). *Reading stories stimulates second language academic vocabulary growth: Fact or fiction?* [Manuscript submitted for publication]. Department of Clinical English, Nara Medical University.
- Mauranen, A., Hynninen, N., & Ranta, E. (2016). English as the academic lingua franca. In K. Hyland & P. Shaw (Eds.), *The Routledge handbook of English for academic purposes* (pp. 44–55). Routledge.
- Mollet, E., Wray, A., Fitzpatrick, T., Wray, N. & Wright, M. (2010). Choosing the best tools for comparative analyses of texts. *International Journal of*

- Corpus Linguistics. 15(4). 429–473.
- Morris, L., & Cobb, T. (2004). Vocabulary profiles as predictors of the academic performance of teaching English as a second language trainees. *System*, *32*(1), 75–87.
- Nagy, W. E., Herman, P. A., & Anderson, R. C. (1985). Learning words from context. *Reading Research Quarterly*, 20(2), 233–253.
- Nation, I. S. P. (2001). *Learning vocabulary in another language* (1<sup>st</sup> ed.). Cambridge University Press.
- Nation, I. S. P. (2017). The BNC/COCA level 6 word family lists (Version 1.0.0) [Data file]. Available from http://www.victoria.ac.nz/lals/staff/paulnation.aspx.
- Nation, I.S.P. (2022). *Learning vocabulary in another language* (3<sup>rd</sup> ed.). Cambridge University Press.
- Nation, I. S. P., & Wang, K. (1999). Graded readers and vocabulary. *Reading* in a Foreign Language, 12(2), 355–380.
- OpenAI. (2023). *ChatGPT* (November 21 version) [Large language model]. https://chat.openai.com/chat.
- Pigada, M., & Schmitt, N. (2006). Vocabulary acquisition from extensive reading: A case study. *Reading in a Foreign Language*, *18*(1), 1–28.
- Poll: Students prefer to read physical books over e-books. (2023, October, 29). *The Yomiuri Shimbun*, p. 2.
- Qian, D. (1999). Assessing the roles of depth and breadth of vocabulary knowledge in reading comprehension. *Canadian Modern Language Review*, *56*(2), 282–308.
- Staehr, L. (2009). Vocabulary knowledge and advanced listening comprehension in English as a foreign language. *Studies in Second Language Acquisition*, *31*(4), 577–607.
- Schmitt, N., Jiang, X., & Grabe, W. (2011). The percentage of words known

- in a text and reading comprehension. The Modern Language Journal, 95(1), 26–43.
- Trenkic, D., & Warmington, M. (2019). Language and literacy skills of home and international university students: How different are they, and does it matter? *Bilingualism: Language and Cognition*, 22(2), 349–365.
- Waring, R., & Takaki, M. (2003). At what rate do learners learn and retain new vocabulary from reading a graded reader? *Reading in a Foreign Language*, *15*(2), 130–163.
- Webb, S. (2008). Receptive and productive vocabulary sizes of L2 learners. *Studies in Second Language Acquisition*, 30(1), 79–95.
- Webb, S. (2020). Incidental vocabulary learning. In S. Webb (Ed.), *The Routledge handbook of vocabulary studies* (pp. 225–239). Routledge.
- Webb, S., & Chang, A. C. S. (2015). How does prior word knowledge affect vocabulary learning progress in an extensive reading program? *Studies in Second Language Acquisition*, *37*(4), 651–675.
- Webb, S., Sasao, Y., & Ballance, O. (2017). The updated Vocabulary Levels Test: Developing and validating two new forms of the VLT. *ITL International Journal of Applied Linguistics*, *168*(1), 33–69.
- West, M. (1953). A general service list of English words. Longman Green.
- Zhou, S. (2010). Comparing receptive and productive academic vocabulary knowledge of Chinese EFL learners. *Asian Social Science*, 6(10), 14–19.

# Appendix A

# Text Prompt for ChatGPT Graded Story

Write a short story (about 260 to 270 words) about a girl called Naomi Nakagawa who is from Yoshino in Nara Prefecture, Japan. The setting for the story is the university entrance ceremony, which is her first day as a

medical student at Asuka Medical University. Her parents are also at the entrance ceremony to support her, and they are hugely proud of her. You should include some background information about all of the sacrifices that Naomi's parents have made to help her to get into medical university. Also, you should include the words "brief", "process", "finally", "enormous", "region", and "occurred" once in the story, and the word "medical" twice in the story. All of the other words in the story should be words within the first 3,000 most frequently used English words from the BNC/COCA corpora. The story should be aimed at intermediate-level (CEFR B1 or B2) English as a second language readers.

## Appendix B

#### Human versus AI Fictional Text Creation

Text 1

In the serene town of Yoshino, nestled in Nara Prefecture, Japan, Naomi Nakagawa's dream unfolded on the grand stage of Asuka Medical University. Today marked the commencement of her medical journey, a day she had long awaited. As Naomi stood amidst the throng of students, her parents, faces beaming with pride, were in attendance. Their joy was palpable, a culmination of the sacrifices they had made to support their daughter's aspirations. Naomi's father, a hardworking farmer, had dedicated countless hours to Yoshino's fertile soil, a process that sustained their family and Naomi's dreams alike. Her mother, a skilled seamstress, had tirelessly crafted garments that mirrored not only warmth but also the dreams they harboured for Naomi. The sacrifices, enormous and quiet, were the threads that wove the fabric of her opportunity.

Finally, the entrance ceremony unfolded, a momentous occasion for Naomi

and her family. The efforts of her parents had not occurred in vain; they had paved the way for Naomi to step into the medical realm. The dean's words echoed through the auditorium, welcoming the aspiring students. Naomi's journey, though just beginning, was a beacon for the small region of Yoshino. It whispered tales of a girl who had dared to dream. As Naomi embarked on her studies, her parents exchanged a brief glance, their silent acknowledgment of the sacrifices that had made this day possible. The Nakagawa family, from the humble town of Yoshino, had set in motion a story of resilience and triumph.

#### Text 2

It was probably the most important moment in my life, and it was over in a few seconds. The professor standing on the stage said, "Naomi Nakagawa", and my name came through the speakers in the large hall. For one **brief** moment, it seemed that the whole world stopped. I stood up as straight and as tall as I could, and in a loud, clear voice, I said, "Yes!" It was official – I was now a **medical** student! The long and painful **process** of studying to get into **medical** school was **finally** over. As I sat down, I turned around to look for my parents in the crowd behind me. But all I could see were hundreds of faces that I didn't know looking down at the stage. Still, I knew that my parents were somewhere in the **enormous** crowd behind me smiling proudly.

My parents worked very hard to help me to get to this point in my life. I am their only child, and they sacrificed a lot to give me a good education and a good life. They both come from a small town called Yoshino in the south of Nara Prefecture. It's a **region** that's famous for its cherry blossoms. On a warm spring evening a few years ago, we were eating dinner together, when my father began talking about their high school days together. Until then, it hadn't really **occurred** to me what my parents were like in their high school days.