

The Efficacy of Word Association Based Cards to Improve Vocabulary Test Scores

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Abstract

Word associations, which arise in response to a specific stimulus word, are considered by Nation (2013) as one of nine essential elements of word knowledge.

Researchers in second language acquisition, including Aitchison (2012) and Haastrup and Henriksen (2000), argue that these associations develop gradually within the learner's mind, suggesting potential challenges in their teachability.

However, Fitzpatrick and Munby (2014) pose the question of whether these associations can be effectively taught in educational settings. This study attempts to investigate this question, by using word association based cards in an attempt to increase the vocabulary test scores of Japanese university students.

Despite the results showing an absence of notable improvements, this report aims to provide a framework for subsequent studies and proposes directions for future research in this field.

Keywords: Word Associations, Vocabulary, Word Cards

The Efficacy of Word Association Based Cards to Improve Vocabulary Test Scores.

This paper investigates whether the use of word cards (using word associations) can improve the vocabulary test scores of Japanese university students. The Literature Review summarizes past research and outlines what word associations are and why they are useful, specifically in terms of vocabulary organization and accessibility.

The following sections detail the procedure used to teach and test the students. The results of the experiment indicated that the word cards, in this instance, did not result in any improvements.

As a result, much of the discussion section will focus on the practical limitations of this research and how it could be improved in future. Despite these limitations, it is hoped that this paper will provide a practical framework for subsequent studies which attempt to word associations in the classroom.

Literature Review

The following section defines what word associations are and explains their role in vocabulary organisation and acquisition. It also gives an outline of how word associations can be taught and some of the problems with attempting to teach them.

Defining Word Associations

Word associations are words that relate and connect to any stimulus word (or target word). The most common way of studying them is by asking a participant to take a productive word association test, where they are given a stimulus word and asked to produce one or more words in response. Table 1 shows the main ways of categorising word association responses.

Table 1*Word Association Response Categories*

Association Category	Sub Category	Example Word Association, With Stimulus Word Given First
Clang (form-based responses)	Phonological	<i>Fan</i> ► <i>fine</i>
	Orthographical	<i>Dig</i> ► <i>dog</i>
Syntagmatic	Collocation	<i>Black</i> ► <i>cat</i> <i>Eat</i> ► <i>dinner</i>
	Compound word	<i>Table</i> ► <i>tennis</i>
Paradigmatic	Superordinate member of lexical set (also: hyponym, headword)	<i>Dog</i> ► <i>animal</i>
	Subordinate member of lexical set (also: hypernym)	<i>Animal</i> ► <i>dog</i>
	Equal member of same lexical set	<i>Dog</i> ► <i>cat</i>
	Meronym (parts of a thing)	<i>Car</i> ► <i>wheel</i>
	Synonym or near synonym	<i>Angry</i> ► <i>mad</i>
	Contrast	<i>Liquid</i> ► <i>gas</i>
Experiential or conceptual	Antonym	<i>Good</i> ► <i>bad</i>
	Conceptual	<i>Field</i> ► <i>fence</i>
	Experiential	<i>Death</i> ► <i>tsunami</i>

Note: The above categories are based on Murphy, 2003, p.9; Fitzpatrick et al., 2015, p.40; Carter, 1998, p.19-21; McCarthy et al., 2010, p.105)

The most common types of word associations are syntagmatic associations (essentially collocations) and paradigmatic associations, (i.e., words of the same word class). Clang associations are often phonetic in nature and are most common with children and early learners of a second language. A fourth category of word associations is "experiential associations", which are related to experiences, media, news, and characters.

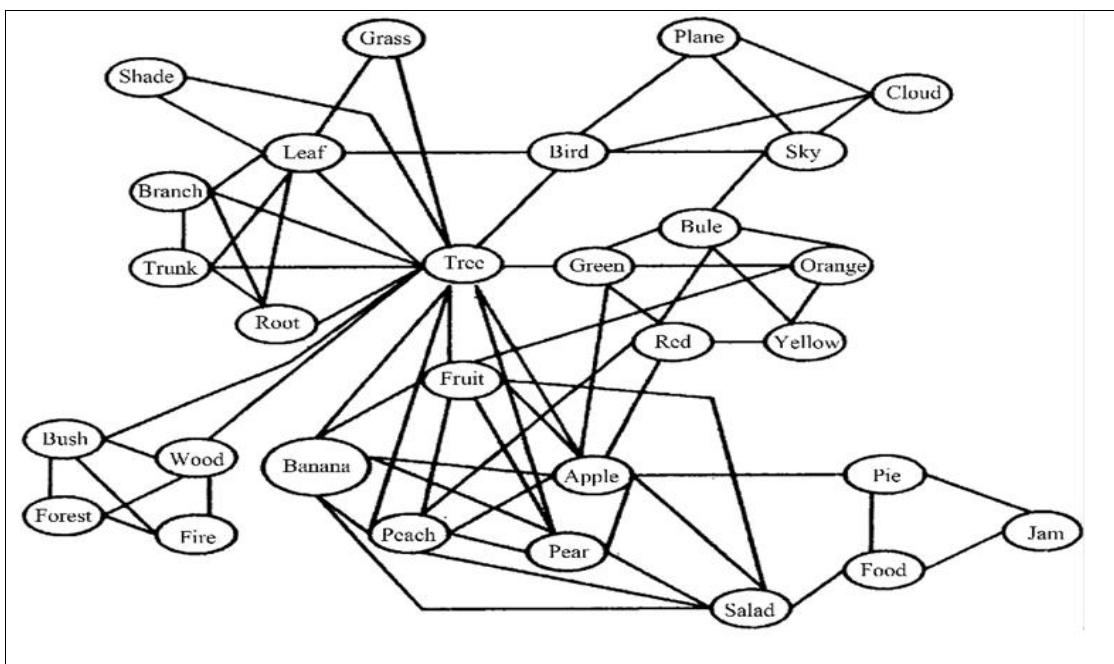
The Mental Lexicon

The collection of words inside the mind of a language learner is commonly known as the "mental lexicon." This metaphor has, according to Henriksen, "gained almost universal acceptance" (2008, p.28). Aitchison (2012) argues that the mental lexicon is likely to exist in

the human mind due to the rapid speed at which people can access large amounts of information about words. It is unlikely that such word stores are arranged alphabetically, because when people struggle to find a word, they rarely choose a word that is adjacent in a dictionary. For example, people are not likely to accidentally say the word "bald" if they meant to say "bale". Thus, it is often assumed that words are stored in semantic networks, but the structure of such networks and their links is something that researchers are unable to agree upon (Henriksen, 2008). Figure 1, below, shows what a small fragment of the mental lexicon may look like.

Figure 1

Fragment of the Mental Lexicon



Note: Adapted from Collins & Loftus (1975)

Knowing A Word

When considering the question of what is involved in knowing a word, many researchers refer to the taxonomy provided by Nation (2013, p.49). It separates word knowledge into form, meaning and use, and has a total of nine subcategories, each of which can be considered in terms of receptive and productive use.

Table 2*The 9 elements of knowing a word*

Form	1.Spoken	R	What does the word sound like?
		P	How is the word pronounced?
	2.Written	R	What does the word look like?
		P	How is the word written and spelled?
	3.Word parts	R	What parts are recognizable in this word?
		P	What word parts are needed to express the meaning?
Meaning	4.Form and meaning	R	What meaning does this word form signal?
		P	What word form can be used to express this meaning?
	5.Concept and referents	R	What is included in the concept?
		P	What items can the concept refer to?
	6.Associations	R	What other words does this make us think of?
		P	What other words could we use instead of this one?
Use	7.Grammatical functions	R	In what patterns does the word occur?
		P	In what patterns must we use this word?
	8.Collolocations	R	What words or types of words occur with this one?
		P	What words or types of words must we use with this one?
	9.Use and constraints on use (register, frequency..)	R	Where, when, and how often would we expect to meet this word?
		P	Where, when, and how often can we use this word?

Notes: **R**=Receptive Knowledge. **P**=Productive knowledge. Adapted from Nation (2013, p.49)

As section 6 of table 2 shows, word associations are one of the nine key elements of knowing a word. Additionally, collocations (element 8) are word associations and are commonly produced in word association tests (Carter, 1998; McCarthy, 1990; Brown, 2014). These will be included in this study as word associations under the term "syntagmatic" word associations.

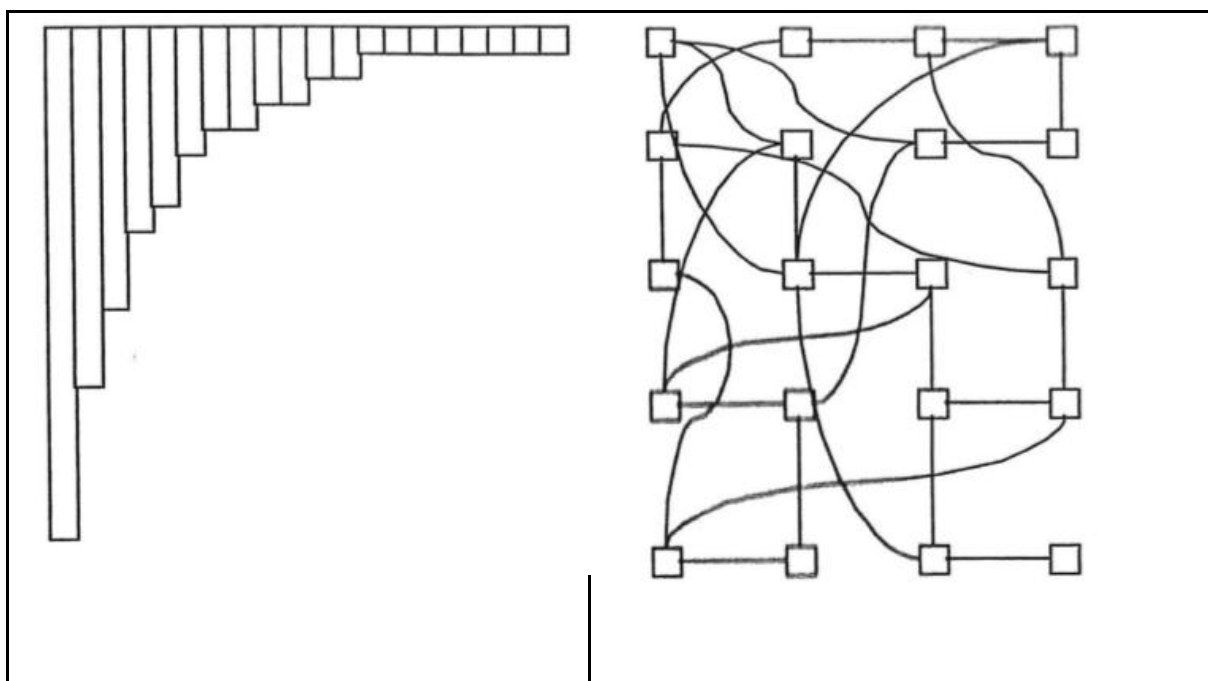
Breadth And Depth of Word Knowledge

Two common concepts of word knowledge are breadth (the total number of words known) and depth (how well the words are known). It is often the case that these two dimensions correlate and as a learner learns more new words, they also learn more about the words they already know. There can be exceptions to this rule, with Schmitt (2014) giving an example of a taxi driver who has a small specialised vocabulary but knows and uses the words very well.

Knowing a word is not a case of "all or nothing." Words can be well known in certain senses, but not in others, as illustrated in the example in the table below (based on Schmitt,

Figure 2

Words in Isolation / Words in a Network



Note: Adapted from Meara, 2009, p.76.

Meara also considers whether vocabulary breadth and organizational strength are likely to be correlated and suggests two theories (2009, p. 82). He proposes that, even among two people with similar vocabulary sizes, there may be differences in the strength of their organizational skills. For example, one person may possess a wide vocabulary but exhibit weak organizational skills, potentially leading to limited comprehension of texts or diminished spoken output.

The second theory posits that organizational skills in vocabulary may not seem critical for beginners, as their immediate goal is to acquire common words. However, as learners advance to higher levels, the organizational structure of their vocabulary becomes increasingly crucial. Without effective organization, learners may reach a plateau, unable to progress further until their vocabulary has been adequately restructured.

A key consideration for this research project is determining whether pedagogical interventions can stimulate vocabulary restructuring, or if progress inherently requires extensive time and repeated exposure. Haastруп and Henriksen (2000) support the latter view, suggesting that the process of building lexical networks—akin to making inferences—demands considerable mental effort and is inherently slow. Similarly, Aitchison (2012, p.221) indicates that network building occurs gradually, while Schmitt (2014, p.918) notes

that aspects of word knowledge more susceptible to direct study are mastered before those requiring exposure to various contexts.

Lexical Accessibility

In addition to vocabulary breadth, depth and organization, some researchers suggest there should be a fourth element of vocabulary proficiency, related to speed and ease of use. Daller et al. (2007, p.8) refer to this as "fluency" while Mochizuki (2012, p.48) uses the term "lexical accessibility".

Milton and Fitzpatrick (2014, p.7) argue that learners can be categorized based on their vocabulary knowledge: those with "declarative knowledge" have a broad and deep vocabulary but limited ability to use these words in context, whereas those with "procedural knowledge" are able to quickly and effortlessly apply their vocabulary in communication. They also mention a tendency for Japanese students to have large vocabularies and the ability to communicate well in writing, but to do less well in oral communication where words need to be accessed and processed quickly. This may be an indication of a mental lexicon that is "top heavy"- filled with too many superfluous vocabulary items. The theory here is that students may be spending time learning unusual words that they will rarely use, when they should instead learn common words more fully, and in turn they will be able to access them quickly in spoken communication. Takač notes that it is important for lessons to "ensure that lexical development follows a logical path, thus avoiding uncontrolled accumulation of sporadic lexical items" (2008, p.18).

It should be noted that some researchers take the opposite point of view. Vermeer argues the more words that a learner knows, the deeper they will understand all of them. In his view, breadth and depth of vocabulary are basically the same construct and "the denser the network around a word... the greater the number of words known... the deeper the knowledge of that word." (2000, p.231).

Both theories merit investigation, but it is the 2nd theory (that of Vermeer) which will form the basis of this research project.

Teaching Word Associations

Fitzpatrick and Munby (2014) ask whether these associations can be effectively taught in educational settings, but very little information exists. In *How Vocabulary is Learned* (Webb & Nation, 2017), word associations are not given significant attention, but there is a greater focus on collocations.

General internet searches on the subject reveal only a handful of websites featuring games and a dissertation where stimulus words were taught using meaning-based and

position-based activities. This work used substitution, definition, antonymy and picture based activities to teach paradigmatic associations, and ordering, matching, cloze and dictionary activities to teach syntagmatic associations (Wharton, 2011, p.60).

Specific sections inside books and journal articles offer the largest amount of information on teaching word associations, and one of the most common methods suggested is to organise vocabulary into semantic networks and "trees" using diagrams. Such diagrams are described by McCarthy as "semantic maps" (1990, p.95) and by Meara as "fragments" of word association networks (2009, p.61).

Drawbacks Of Teaching Word Associations

One issue worth considering is that many researchers warn against teaching new vocabulary in lexical sets due to interference and cross association (Tinkham, 1993, 1997; Waring, 1997; Schmitt, 2000; Papathanasiou, 2009). Lexical sets refer specifically to organised paradigmatic associations (for example, types of jobs, parts of the human body) and not to syntagmatic associations.

The approaches deemed most counterproductive when introducing new words in lexical sets include using near synonyms, free associates, and opposites (Nation, 2000). However, the use of lexical sets and word associations becomes less detrimental and can even be beneficial at higher learning levels, especially when used for reviewing and classifying already known words (Nation, 2000, p.6; Webb & Nation, 2017, p.81).

In summary, evidence supports the existence of mental lexicons and word association networks within the minds of language learners. Furthermore, word associations (both syntagmatic and paradigmatic) play a crucial role in vocabulary learning. Research has particularly suggested that word associations can enhance vocabulary organization and accessibility.

However, only a limited number of studies have explicitly attempted to teach word associations as a strategy to improve vocabulary acquisition. Haastrup and Henriksen (2000) argue that forming word associations in the learner's mind takes a considerable amount of time, whereas Vermeer (2001) contends that learning new words could enhance the learner's knowledge of all known words.

Research Issues and Questions

The research question for this study follows the theory of Vermeer (2001) that learning more words may be able to strengthen the knowledge of all words in the mental lexicon. Given the scarcity of research in this area, this investigation represents a novel line of inquiry. There was also a practical reason why the theory of Vermeer was chosen as the

basis for this research: a significant number of new words were included in the course and therefore teaching and testing them was mandatory.

Research Question 1: Does the explicit teaching of word associations using word cards lead to improvements in vocabulary test scores?

Given the detailed drawbacks of teaching lexical sets (i.e., paradigmatic associations) earlier, the word cards in this study will primarily feature syntagmatic associations (i.e., collocations) for the target words to be tested.

Method

The study involved two classes of first-year Reading students at a Japanese university. Each group had 13 members. The test group of 13 students received word association instruction in the form of word cards, whereas the control group did not. All participants were assessed four times, via a multiple-choice gap-fill test at the middle and end of two semesters.

Test Group Instruction

Participants in the test group were provided with word cards, which featured new vocabulary from the textbook (target word) surrounded by associated words. These associations were primarily collocations (syntagmatic associations) and were presented in a sequential format. At the bottom of each card, some paradigmatic associations, including synonyms and antonyms, were also included; synonyms were printed in green font, and antonyms in red font. The word associations were mostly derived from two word association lists compiled in the UK and the USA:

- Edinburgh Associative Thesaurus (Kiss et al., 1973)
- University of South Florida Free Association Norms (Nelson et al., 1998)

Additionally, word associations were collected from four websites:

- British National Corpus
- Sentencedict.com
- Thesaurus.com
- Freecollocation.com

The cards were provided in electronic form (a JPEG image) and given to the students via an online learning platform (Google Classroom). An example of one of the cards can be found in Appendix A. During each lesson, ten minutes were allocated for students to review the cards and assimilate the information. If students encountered unfamiliar words among the associations, they were encouraged to collaborate and look up the Japanese meanings in a dictionary. Furthermore, students in the test group were advised to utilize the word

association cards for completing homework assignments and were allowed to use them during vocabulary tests.

Control Group Instruction

The control group was exposed to the target words (i.e., new vocabulary items) in the textbook *Making Sense of the World* (De Soete, 2014) and the test group also had the same exposure. In the textbook, 5 target words are highlighted in bold within reading passages, providing students with relevant collocations. For example, in the case of the target word "impressive," the collocations "most" and "natural wonders" are given (see Appendix B).

These 5 words were generally new to students and were introduced each week. Additionally, the textbook had a definition matching exercise (see Appendix C), which was completed by all students (both the test and control groups) in the classroom and then repeated as homework.

Testing Procedure

Vocabulary tests were conducted online via Google Classroom quizzes. Students in the test group were permitted to use the word cards during the test. The tests consisted of 20 multiple-choice gap-fill questions, each with ten possible answers, covering words introduced in the preceding five lessons (see Appendix D). Of the 25 new vocabulary items introduced across these five lessons, only 20 were selected for inclusion in each test. The complete list of 80 test words and gap-fill questions is available in Appendix E.

It is worth noting that collocations involving any two words from the gap-fill tests were deliberately excluded from the word cards to ensure fairness by preventing the test group from gaining an unfair advantage. For instance, in the test, the word "impressive" (target word) is followed by the collocation "talent," which was intentionally omitted from the "impressive" word card.

Data Analysis Instruments and Procedures

Test scores were collected from Google classroom and analysed using an Independent-Samples Mann-Whitney U Test. Four sets of test scores were collected for both the test group and control group. Tests 1 and 2 were at the middle and end of semester 1, and Tests 3 and 4 were at the middle and end of semester 2. Test scores were out of 20 points, with 15 or 16 indicating an "A" grade, and less than 12 indicating a fail (although in the course, failing the vocabulary test alone did not lead to an automatic fail).

Results/Findings

The results of the vocabulary tests are shown in Table 4 and show that both the test group and control group produced similar results. Most notably, the differences between tests

are very similar.

Table 4

Vocabulary Test Scores of Participants

	Control Group average score out of 20	Difference between previous test score	Test Group average score out of 20	Difference between previous test score
Test 1	13.53	NA	14.00	NA
Test 2	11.61	-1.92	12.07	-1.93
Test 3	16.00	+4.39	16.38	+4.31
Test 4	15.00	-1.00	15.76	-0.62

Note: Test group and control group both had 13 members.

Statistical analysis confirms that there was almost no difference between the two groups. An Independent-Samples Mann-Whitney U Test found no significant difference in scores between the test and control groups across all comparisons: between Tests 1 and 2 ($p = .614$), between Tests 2 and 3 ($p = .920$), between Tests 3 and 4 ($p = 1.000$), and between Tests 1 and 4 ($p = .880$).

Based on the data collected, Research Question 1 (Does the explicit teaching of word associations using word cards lead to improvements in vocabulary test scores unequivocally produced a negative result.

The students in the test group were asked to rate the usefulness of the word association cards through a survey, which employed a 5-point Likert scale. 86% of the test group found the cards to be either “helpful” or “very helpful.” This indicates that although the cards may not have resulted in improvements on the test that was conducted, they may have helped in other ways. Unfortunately, no qualitative data was collected to discover how and why the students found them to be useful.

Discussion

This section explores potential reasons why the teaching intervention did not lead to improved test scores among the students.

Problems With Teaching Word Associations

Previous research indicates that teaching words from a semantic set can negatively impact learning. While the word cards in this study primarily utilized collocations, the possibility remains that students were overwhelmed by an excess of information and new vocabulary. This may have hindered their comprehension of the target words used in the tests

Problems With New Words

As noted in the literature review, word associations aid in understanding the organization of known words, but there is disagreement about their effectiveness in acquiring new vocabulary. Many students likely encountered both the target words and their associations for the first time in this study. Thus, word association data might be more beneficial with vocabulary *already known* to the learners, with the aim of enhancing lexical organization and accessibility.

Type Of Testing

The administered test was a multiple-choice gap-fill, focusing solely on the target words and it as a result it did not evaluate the actual knowledge of word associations. Consequently, any improvements in the test group that were not directly related to the target words may have gone undetected. Ideally, a word association test could have measured their progress in the associated words more accurately. There are two main types of word association tests: the productive test, where participants are prompted with a stimulus word and must generate responses, and the receptive test, where participants choose the best responses from multiple options provided alongside a stimulus word. Receptive tests have been developed by Read (2000), Greidanus and Nienhuis (2001), and Schoonen and Verhallen (2008). However, due to classroom time constraints, neither productive nor receptive word association tests were conducted in this study.

A second point worth noting is that the collocations used in the gap fill test were intentionally removed from the word cards. If they had been included, it is possible that the test group could have memorised the exact word collocations used in the test and shown a greater improvement. With the tests being part of the actual grading of the course, such an imbalance would have been unfair on the control group.

Type Of Teaching

The word cards may have been an insufficient form of teaching for the students, for three reasons. First, they were provided in electronic form as a JPEG image. A different form, such as a phone app, may have been more suitable, as it would have been more accessible and user friendly for students than an image.

Additionally, Wilkinson (2020) notes the advantages of paper-form cards, including the tangible aspect and the opportunity for students to add their own associations and translations in their native language

A second issue with the word cards was that the limited time allocated to using the word cards; only ten minutes were dedicated during each lesson, although students were encouraged to use them for homework.

Finally, incorporating different types of teaching activities (such as those used by Wharton, 2011) may have improved the students' understanding of both the word associations and the target words. The exclusive use of receptive methods in this study (i.e., reading the cards) may have limited the learning experience and incorporating productive activities (for example, asking students to brainstorm associations) could potentially offer greater benefits.

Conclusion

This research project aimed to improve the vocabulary test scores of Japanese students through the use of word association cards. The results did not indicate any significant improvement, which may be attributed to design flaws in the implemented testing and teaching procedures. Despite these outcomes, this paper seeks to offer a framework for conducting similar experiments and highlights the significance of word associations in vocabulary organization. Two suggestions for future research are proposed in the following sections.

Suggestion For Future Research 1

One limitation of this project was the use of new words as target words, which meant that students often did not fully know either the target words or the collocations and associations. Accordingly, the following question may be worth considering: Could word cards, and other forms of word association teaching, be more beneficial when reviewing already known words? For such an experiment, it seems likely that word association tests would be the best instrument for measuring progress, and a combination of both productive and receptive tests would be recommended.

Determining the vocabulary already known by learners presents a challenge, but the New General Service List (Browne et al., 2013) offers a promising starting point.

Suggestion For Future Research 2

Could large language models (LLM), such as ChatGPT, be used to conduct word association research? Higginbotham (2010) suggests using word association tests to create individual learner profiles, which could assist learners in identifying effective vocabulary learning strategies and in choosing the most pertinent words for their studies. The potential

for an LLM to streamline and enhance this process offers an intriguing avenue for future investigations.

BIO DATA

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Appendix A

Word Card

<p>far from very truly most particularly</p>	<p>impressive</p>	<p>achievement performance display victory sight results record growth figure</p>
<p>impressive = important, remarkable, exciting, extraordinary</p>		
<p>Impressive <> unimpressive, ordinary, mediocre</p>		

Appendix B

Textbook Reading Passage, From De Soete, 2014

wonders for various themes, such as the seven wonders of the Solar System and the seven wonders of the natural world. With regard to the natural wonders of the world, Mount Everest, the Great Barrier Reef, Victoria Falls, and the Grand Canyon consistently rank among the most **impressive**³ on published lists. There is therefore no official list for the wonders of the world, but there is widespread agreement about the prominence of some natural wonders. 25

CD1-38 The closest thing to an official list for the most significant places on Earth is the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List,



30

Appendix C

Textbook Definition Exercise, From De Soete, 2014

VOCABULARY

Try to use the context in the reading section to figure out the correct definition for each vocabulary word in the column on the left.

- | | | |
|---------------|--------------|--------------------------------|
| 1. prominent | () | a. important and/or noticeable |
| 2. compile | () | b. to meet unexpectedly |
| 3. impressive | () | c. worth paying attention to |
| 4. encounter | (3) | d. very admirable |
| 5. notable | () | e. to assemble information |

Appendix D

A Question From The Vocabulary Test

3. The musical talent on display is extremely _____ . Everyone thought it was a great performance!



Multiple choice

- prominent
- compile
- distinction
- tackle
- impressive
- notable
- encounter
- imitate
- concede
- popular
- implement



Appendix E.

The Test Words And Gap Fill Sentences

TEST 1

Conduct> Police will *conduct* random breath tests.

Warn> He flashed his lights to *warn* the oncoming cars.

Promote> The government must *promote* racial equality.

Beneficial > Sunshine and water are *beneficial* to living things.

Obvious> There is an *obvious* contrast between the cultures of East and West.

Perpetual> He is on a *perpetual* search for truth.

Motivation> What was your *motivation* for becoming a teacher?

Minimum> The *minimum* wage was set at \$8.20 an hour.

Massive> The bell is *massive*, weighing over 40 tons.

Diverse> New York is a very culturally and ethnically *diverse* city.

Minor> This is a very *minor* operation and there is very little risk involved.

Guarantee, verb>> We cannot *guarantee* our flights will never be delayed.

Emergence> The *emergence* of small Japanese cars in the 1970s challenged the US and European manufacturers.

Permanent > I have a *permanent* job here.

Sustain> Few planets can *sustain* life.

Innovative > There will be a prize for the most *innovative* design.

Unique> Each person's fingerprints are *unique*.

Discriminate> It is illegal to *discriminate* on grounds of race, sex or religion

Dynamic> He seemed a *dynamic* and energetic leader.

TEST 2

Prominent>> The story was given a *prominent* position on the front page.

Compile>> The book took 10 years to *compile*.

Impressive>> The musical talent on display is extremely *impressive*.

Encounter, verb >> We *encounter* so many problems in our work.

Notable >> Every country in the world signed the treaty, with one *notable* exception - the United States.

Distinction>> Is there always an absolute *distinction* between right and wrong?

Imitate>> Children always *imitate* the example of adults.

Welfare>> My main concern is the *welfare* of the children.

Strive>> We encourage all members to *strive* for the highest standards.

Reprehensible>> I find their behavior morally *reprehensible*.

Abuse, verb>> Drug *abuse* poses a major threat to the fabric of our society.

Concede>> I was forced to *concede* that she might be right.

Hostile>> The group chairman faced *hostile* questioning from angry shareholders.

Displace>> Flooding caused by the dam may *displace* up to a million people.

Recognize>> I *recognize* you now. You are Mary's husband.

Explode > The bomb was timed to *explode* during the rush-hour.

Hazardous>> Smoking is *hazardous* to your health.

Component >> Enriched uranium is a key *component* of a nuclear weapon.

Implement, verb>> The government failed to *implement* the plan.

Popular >> Shrimps are a *popular* type of seafood.

TEST 3

Distinguish>> What characteristics *distinguish* the Americans from the Canadians?

Ideal >> The hotel is *ideal* for families with young children.
Inheritance>> She left him an *inheritance* of £ 100 000.
Criticize >> It's not fair to *criticize* without giving her the chance to answer back.
Manipulate>> She uses her charm to *manipulate* people.
Initially>> The island's population *initially* numbered 180, but there was a gradual decline until only 40 people were left.
Brutally>> They were caught on camera as they *brutally* attacked a man.
Aid, noun>> Humanitarian *aid* is being sent to the refugees.
Cautious>> He was *cautious* when he was riding the bicycle.
Collapse, noun>> The unexpected rainstorm caused the *collapse* of the roof.
Presence>> Your *presence* is requested at the meeting.
Security>> The UN *security* council may impose economic sanctions.
Gesture, noun>> He made a rude *gesture* with his fingers.
Vicinity >> The stolen car was found in the *vicinity* of the station.
Collide>> It was predicted that a comet would *collide* with one of the planets.
Struggled>> He *struggled* to swim against the flow of the water.
Vulnerable>> Old people are particularly *vulnerable* members of our society.
Escalate>> The conflict could *escalate* into a full-blooded war.
Universal>> English is referred to as a *universal* language.
Currency>> The bank will supply and buy back foreign *currency*.

TEST 4

Contradict >> The two stories *contradict* each other by giving opposite information.
Revolves >> The moon *revolves* around the Earth.
Investigate>> A committee will *investigate* allegations of racial discrimination.
Prevalent> Influenza is most *prevalent* during the winter months.
Estimate>> At a conservative *estimate*, the holiday will cost about £ 1500
Clashed>> A group of 400 demonstrators *clashed* with police.
Identical>> The two pictures are similar but not *identical*.
Convincing>> We need to provide a *convincing* argument as to why the system should be changed.
Vast>> Vast areas of land have become desert.
Fatal>> Hepatitis is a potentially *fatal* disease
Obstacle>> Fear of change is an *obstacle* to progress.
Manageable>> My hair is more *manageable* since I had it cut.
Primary>> The *primary* aim of this course is to improve your spoken English.
Eternal>> She felt *eternal* gratitude to him for saving her life.
Fundamental>> Hard work is *fundamental* to success.
Scarcity>> The *scarcity* of skilled workers is worrying the government. More are needed.
Perilous>> The journey through the jungle was *perilous*. Many dangerous animals, cliffs, and rivers were found there.
Vicious>> Keep away from that dog! He can be *vicious*.
Skeptical>> It will take a lot to convince the increasingly *skeptical* American public.

Notes

- 1: The test words (i.e. also the target words on the cards) are displayed in bold.
- 2: All the words listed above were used in the vocabulary tests as gap fill questions.
- 3: All collocations used in the test sentences above were omitted from the word cards. For example, in the case of the test word "perilous", the collocation "journey" was omitted from the word cards.

4: All the words from tests 2,3 and 4 were presented as the target words on the word cards. However, the words from test 1 were not taught using word associations, and no word cards were given for these words. This was to ensure that the test 1 scores created a "start point" where neither group had received any special instruction.