Activating Accurate Vocabulary Use in Spoken English: Collocation-Focused Classroom Action Research at a Japanese University

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Abstract

At the Center for Language Education at an international Japanese university, there have been level-wide changes where students are now assessed on their ability to use new target vocabulary accurately in their speaking tests. However, during these assessments students were observed to make errors frequently when using target vocabulary and their collocations. Research has shown that accurate collocation use is a key factor in differentiating between highly fluent speakers and second language learners (Booij, 2012; Bui, 2021; Godwin-Jones, 2018; Shei & Pain, 2000; Nation, 2003 ; Nesselhauf, 2003). Learning vocabulary through collocations has also proved to be an effective method in bridging the gap between comprehension and productive language use (Shei & Pain, 2000; Gass & Selinker, 2008). Therefore, a series of collocation-focused vocabulary interventions were devised with the aim to enhance students' automatization of accurate vocabulary production (DeKeyser, 2007). This classroom action research project included the participation of 10 classes, totaling 183 students. This paper showcases the results of a corpus analysis of student speaking tests, which indicated that collocation-based interventions had a positive impact on collocation accuracy in speaking.

Key Terms: *collocations, vocabulary acquisition, Japanese tertiary education, classroom action research, vocabulary accuracy, vocabulary in speaking, corpus analysis*

1. Introduction:

The ability to acquire new vocabulary becomes more difficult as English learners' levels increase (Altenberg & Grander, 2001; Koya, 2003; Nesselhauf, 2003; Sanguannam, 2007). This is in part due to challenges in using the word correctly in context. This necessitates not only a clear understanding of the word itself but also the lexical, grammatical, and idiomatic combinations that frequently occur with the target word. According to a corpus study of spoken and written English, Erman and Warren (2000) estimated that 55% of productive English consists of collocated structures, which highlights the importance of its instruction in the English language classroom. Studies in English collocation use have further emphasized the importance of collocation accuracy as it is believed to be one of the greatest factors differentiating highly fluent speakers and second language learners (Booij, 2012; Bui, 2021; Godwin-Jones, 2018; Shei & Pain, 2000; Nation, 2003; Nesselhauf, 2003; Pawley & Synder, 1983). In addition, collocation knowledge has been shown to enhance not only learners' accuracy but also fluency (Wray, 2002). Therefore, it can be argued that explicit instruction of collocations is required to support students in their journey towards becoming

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successful speakers of English (Koya, 2003; Memarian-Morajab & Farjami, 2020; Ozaki, 2011; Pakadaman & Gilakjani, 2019; Shei & Pain, 2000; Webb et al., 2013). Despite a wealth of research on vocabulary instruction in Japanese universities, few empirical studies have focused on teaching activities that specifically target improving students' accurate use of collocations in speaking (Ghezelseflou & Seyedrezaei, 2015; Koya, 2003; Kurosaki, 2010). Thus, this classroom action research project aims to fill a gap in collocation research within the Japanese university EFL context.

The study outlined in this paper addresses the issue of correct contextual vocabulary usage by Japanese intermediate learners of English. The study took place at an international university in southern Japan. Specifically, this study focused on a course that develops students' speaking, listening and writing skills, and grammar and vocabulary to an A2+ to B1 level on the Common European Framework of Reference for Languages (CEFR). For speaking, students are expected to discuss academic topics and present research using skills in the Global Scale of English (GSE) 39 to 50 range. As part of this, students are faced with a range of new academic vocabulary and associated common collocations. Therefore, the motivation for this action research project was to support students' accurate use of academic vocabulary specifically regarding collocation accuracy on speaking assessments.

It was observed that while students displayed competent receptive knowledge regarding new vocabulary, they struggled to use the words accurately in speaking. This observation is supported by researchers in the field of English vocabulary acquisition in Japan. Ozaki (2011) confirms that collocations prove to be problematic for learners' productive skills in speaking and writing, as opposed to the receptive skills of listening or reading. Furthermore, even when students are able to comprehend collocation phrases receptively, they struggle to produce them accurately (Ozaki, 2011). Such production errors from this study can be seen in Table 1 below.

Table 1

Examples of Student Collocation Errors

Student Utterance	Error
'smiling makes me positive **attitude**'	Verb+Adj+Noun error (no verb)
'expressing gratitude to family or friends gives good **effect** for people'	Noun1 + Preposition + Noun2 error (to people)
'I think having a job which I like is **significant** to be happy.'	Verb form error (to being)/ Preposition and word form error (for happiness)
'they gathering **data**'	Verb + noun error (are gathering/gather)
'is important for people to set goals to **achieve** easy'	Verb + Adverb error (easily)

In some cases, students were able to successfully complete the discussion test without using any target vocabulary. This is because, at this level, students already have a fundamental knowledge of English and can discuss the topic using alternative vocabulary instead of the target words (Koya, 2003; Nesselhauf, 2003). To illustrate this, a section of a student speaking test is given in Table 2 below. In this test, students were asked to discuss a topic for 5 minutes. In accordance with the rubric, students are graded on their ability to present opinions, interact with, and ask their partner questions, agree and disagree with each other, and use target vocabulary and grammar points.

Table 2

Sample Student Speaking Test Extract

Student	Utterance
Student A	I see, I see what you mean but, I think uhm, be healthy is more important for happiness because, if we we aren't healthy, we can't other things, like meet friends or, eating uhm, eating food, or hmm, go out with friends or family, so and, and having a job, so being healthy is the most important for happiness and we live, uhm, so which is the least important?
Student B	I think being married is uh, most, that, least important because people, if people not married, they can, they can feel happiness with other things, so, everybody that should not, have, have not married in their lives, how about you?
Student A	uhm, yeah I agree with your idea, I think so. I think being married is the least important because uhm, being married, uhm, hmm, being uhm, if we, if we aren't married, we, we can use own time, of free time like, go abroad with friends or family or, uhm, and, don't take care uhm husband or child, so I think being married is least important in, for things,
Student B	Yeah, for happiness

This extract, which makes up 50% of the students' overall utterances, shows students successfully fulfilling several of the rubric criteria. They are presenting their own ideas, interacting with each other, asking questions, and using the target grammar points (underlined in the extract). However, throughout this entire exchange, students did not produce a single target vocabulary word. A study by Koya (2003) on Japanese learner vocabulary acquisition may shed some light on the above finding. Koya found that, regarding the production of new vocabulary, Japanese learners are unlikely to take risks and will often opt to use word combinations with which they are already highly familiar to avoid making mistakes. Thus, as the above control group did not receive vocabulary collocation interventions, it can be argued that they were not familiar enough with the usage of target vocabulary to risk using new words in a discussion.

It is evident from existing research that a collocation-based approach to vocabulary acquisition could prove invaluable in cultivating vocabulary accuracy with spoken English (Booij, 2012; Godwin-Jones, 2018; Nation, 2003; Nesselhauf, 2003; Shei & Pain, 2000; Wray, 2002). The interventions for the current study focused on increasing the frequency at which students encounter and use target collocations in a variety of authentic contexts, which has been shown to be effective in improving students' accurate vocabulary use (Dickinson, 2008; Memarian-Morajab & Farjami, 2020; Nesselhauf, 2003).

2. Literature Review

2.1 Defining collocations and the challenge for L2 learners

As this paper discusses challenges students face with learning collocations and the subsequent interventions, a clear delineation of collocations is required. Although there are many different definitions for collocations, for the purpose and scope of this paper, collocations can be best described as a set of words that contain a limited grammatical or lexical restriction (Benson et al., 1997). Common examples analyzed in this study are as follows: Verb + Noun/Preposition (*to set goals*), Adjective + Noun (*positive effect*), Noun1 + Preposition + Noun2 (*effect on sth*), Verb + Adverb (*understand clearly*), Adverb + Verb (*positively affect*).

When using a non-native language, it is necessary not only to understand these lexical and grammatical word combinations, but also have some knowledge of fixed idiomatic expressions. Jeon's (2009) study on collocations highlights this challenge with the Adjective + Noun word combination *strong tea;* the adjective used is *strong* rather than *mighty* or *powerful*, although both are grammatically correct. The words *mighty, strong* and *powerful* are interchangeable in many contexts; however, not in the case of describing tea. This idiomatic collocation example exemplifies challenges that English learners face when learning collocation sets that contain arbitrary semantic restrictions.

There are no well-defined rules to determine collocation preferences in speaking, which presents new challenges for language learners. Students studying vocabulary are prone to use word combinations that are semantically and grammatically accurate yet may sound unnatural to highly fluent speakers (Pereira & Matsumoto, 2015). These collocation errors are believed to be a barrier to accurate vocabulary use and impede comprehension in speaking (Gass & Selinker, 2008; Schmidt, 2000). Therefore, it can be argued that in an EFL setting where L2 usage is often limited to the classroom, explicit instruction of accurate collocation use requires attention.

2.2 Vocabulary Acquisition and Collocations in the Japanese English Education context

As the participants in this classroom action research project were Japanese university English learners, it is essential to understand vocabulary acquisition and the challenges of learning collocations in the Japanese context. Additionally, although there has been a wealth of research conducted on L2 collocations in European languages, the limited number of empirical studies that focus on collocation usage in Japan served as motivation for this study (Kurosaki, 2010; Koya, 2003).

One challenge for Japanese English learners studying collocations is the impact of L1 influence. Many studies have shown that L1 collocation transfer can often disrupt L2 processing of collocations (Koya, 2003; Kurosaki, 2010; Lis Pereira & Yuji Matsumoto, 2015; Ozaki, 2011; Shitu, 2015; Yamashita & Jang, 2010). Furthermore, learners in Japan have limited exposure to English outside of the classroom and therefore are often not aware of the differences in collocational restrictions between their L1 and their target language (Ozaki, 2011). It is believed that increased exposure to collocations in many different contexts is essential to help learners

automatize their use (DeKeyser, 2007; Hu & Nassaji, 2016; Khezrlou et al., 2017; Vasiljevic, 2008; Webb et. al, 2013; Webb, 2007). Students who do not receive adequate exposure to collocations in their daily environment are at risk of "lexical fossilization", that is, permanently mislearning an incorrect collocation phrase (Vasiljevic, 2008, p. 3).

Another barrier facing Japanese English learners studying collocations is accuracy in speaking. Research has shown that incorrect use of collocations in speaking often impedes comprehension for the listener more than common grammatical errors (Gass & Selinker, 2008; Schmidt, 2000). This project analyzed Japanese learners' use of target vocabulary collocations on a speaking task, thus challenges in using collocations in productive skills require investigation. One study conducted by Ozaki (2011) found that while learners may be able to understand collocations in receptive processes, they struggle to use them properly when reproducing the language in speaking tasks. He determined that Japanese learners of English require explicit pedagogical treatment to improve their accuracy in using collocations productively. Moreover, a case study by Koya (2003) discovered that Japanese learners are not risk-takers and will often paraphrase their way around collocations that do not have common Japanese equivalents. Koya (2003), concluded that Japanese learners of English need explicit collocation training.

2.3 Collocation-focused Vocabulary Studies

As this classroom action research is focused on analyzing the efficacy of collocation-based vocabulary activities, it is essential to understand previously conducted research studies that implemented collocation interventions. One of the long-held beliefs of experts in the field of vocabulary acquisition is the *redundancy principle*, which states the more a word is encountered in a variety of contexts, the higher the chance the learner will be able to produce it accurately and naturally (Ellis, 2012; Hu & Nassaji, 2016 Khezrlou et al., 2017; Lin et. al, 2011; Vasiljevic, 2008; Webb et. al, 2013). This concept of the *redundancy principle* provided the basis for the current study to include daily collocation-based activities over a two-week period. DeKeyser argues that by providing students with many opportunities to use the words with their collocations in targeted activities, it may be possible to facilitate the automatization of vocabulary knowledge; that is, to produce the words spontaneously, effortlessly, quickly, and accurately. A study of collocation-based interventions conducted by Pakadaman and Gilakjani (2019) on Iranian intermediate EFL learners compared the effectiveness of collocation-based activity interventions versus traditional vocabulary instruction regarding student performance on vocabulary tests. The findings concluded that the experimental group that received the collocation interventions significantly outperformed the control group. A similar study at a Taiwanese university by Webb, Newton, and Chang (2013) found that receptive exposure to vocabulary collocations in reading and listening improved students' vocabulary accuracy. Although their study did not include the implementation of explicit collocation-based activities, their findings support the importance of the redundancy principle. Furthermore, in an Iranian university English program, Memarian-Morajab and Farjami (2020) studied vocabulary acquisition and discovered that explicit collocation-based vocabulary instruction

enhanced student speaking fluency and accuracy. They concluded that providing supplemental collocation instruction positively impacts students' productive skills. The above studies support the importance of repetition and collocation-based instruction in improving students' vocabulary accuracy in speaking, hence, justifying this study's approach of implementing collocation-based activities to improve students' vocabulary accuracy on speaking tasks.

Research Question:

As can be seen above, collocations are an essential aspect of a language learner's vocabulary development. Although there have been many studies conducted on L2 vocabulary acquisition, L1 interference in vocabulary learning, and Japanese attitudes towards speaking, there is a clear gap in the research that supports the exploration of the use of interventions to improve vocabulary accuracy in speaking in the context of Japanese higher education. To properly achieve the goals of this study, the following research question was proposed:

Do supplemental collocation activities have a measurable effect on students' productive collocation accuracy in speaking?

3. Methodology

3.1 Background

This study was carried out as part of an intermediate English course (CEFR A2 - B1, GSE 38-50) at a Japanese university. Across the intervention and control groups, a total of 185 students were involved in the study. 173 of the participants were Japanese, with the remaining 12 students being highly fluent South Korean speakers of Japanese. The course consists of four 100-minute periods per week over a period of 14 weeks, and focuses on speaking, writing, and listening skills.

The vocabulary lists used in the course are derived from the course textbook – *Contemporary Topics 1* (fourth edition). Currently, vocabulary instruction within the course consists of textbook exercises, a vocabulary list that students complete including the submission of example sentences using the target vocabulary, and a series of online review activities, predominantly gap-fill style questions. On the vocabulary lists, there are gap-fill sections of common collocations that students are required to fill in using the Longman Dictionary of Contemporary English Online. The supplemental collocation activities in this study were administered concurrently with the existing course materials over a period of two weeks. Due to time constraints, interventions were limited to 15 minutes per activity.

3.2 Pilot Study

To determine the validity of the intervention process and to provide insight into suitable methods to optimize the process, a small-scale initial study was carried out with four intermediate English classes (totaling 72 students) based on the final unit of the semester. One class acted as the control

group and received no additional vocabulary instruction beyond the materials already provided as part of the course, whereas the remaining three classes received a collocation-based intervention every class over a period of two weeks (totaling eight interventions). The first four interventions focused on receptive skills, with the remainder encouraging more productive and spontaneous usage of the target collocations. As all interventions were delivered in addition to the existing course materials, students in the control group were still instructed in accordance with the course guidelines.

Data was gathered by recording student discussion tests. In the intermediate English course, students take four discussion tests. For this study, the unit one speaking tests were recorded, transcribed, and analyzed to assess student vocabulary production. As speaking tests provide a controlled environment where students are all given the same discussion task, it was deemed to be suitable for data collection.

The results from this study suggested that the interventions did not have a significant effect on students' scores on receptive gap-fill style tests. All classes, including the control group, increased their scores by a similar amount. However, after transcribing and analyzing student speaking tests, a noticeable increase in productive collocation accuracy (rising from 50% in the control group to 100% in the intervention groups) was observed.

3.3 Expanded Study

Based on these findings, it was decided to expand the study to include six intervention classes (111 students) and four control classes (72 students) to provide a wider and more significant data set. The population for this study was chosen by purposive, or judgment sampling as the researchers were employed by the participating university. When students are placed into classes, the English department placement coordinator divides students to ensure that classes have an equal number of high achievers, average achievers, and low achievers based on either their GSE placement scores (for newly admitted students) or scores in their previous English class. The university places students in this manner to reduce having classes of only high-achieving or low-achieving classes. Therefore, all classes chosen for this study can be considered comparable in terms of student ability and achievement, which means the sample can be considered an adequate representation of intermediate Japanese learners at the university. Additionally, it should be noted that four of the intervention classes were the classes of the researchers in this study.

The target vocabulary and collocations that were given to students on vocabulary lists for the unit in question (Unit 1) are detailed in Appendix 1. These words and their collocations therefore also formed the basis of the intervention activities. The interventions for this project were developed after consulting with colleagues at the university who had a strong background in vocabulary activity development. As mentioned in the pilot study, the vocabulary interventions consisted of a mix of productive and receptive activities. The sequence of activities was designed to follow a scaffolded approach including gap-fills, sentence stems, and conversation strategies that encourage questions, reformulation, repetition, or elaboration. Considering these scaffolding

techniques, the interventions in this study moved from repetitive dictation tasks, through tasks that encouraged students to repeat target structures in response to questions, to tasks where students were encouraged to use the target vocabulary and their related collocations during a discussion (the specific activities are detailed in Appendix 2).

It should be mentioned that due to the continued influence of the Covid 19 pandemic, the university implemented a system named Switch to reduce the number of people on campus where students were divided into two separate groups and alternated between a week of online classes administered via Zoom, and a week of face-to-face classes taught on campus. This means students in the study attended classes in three separate class formats. The table below outlines the layout of treatment and control classes.

Table 3

Class Format Types During COVID-19

	Intervention Class	Control Classes	Speaking Test Delivery
Online Only	0	2	On Zoom
Switch Even	3	0	On Zoom
Switch Odd	3	2	In-Person

To create as balanced a data set as possible, participatory classes were chosen across these three groups. However, due to the wide scope of this study, some compromise was required. It was decided to prioritize the speaking test delivery method in a balanced way across the data set – for both the intervention and control classes, half of the data was gathered from in person speaking tests and the remainder was gathered by recording student speaking tests conducted on Zoom. However, due to the distribution of classes within this Switch system, it was not possible to have an equal number of control and intervention classes. Nevertheless, the test structure and questions did not change, regardless of delivery method.

Speaking test transcriptions were then compiled into two separate corpora for analysis – an intervention corpus of 29,567 words, and a control corpus of 15,102 words. The corpus analysis tool used for this data set was the AntConc text analysis toolkit (Version 3.5.9; Anthony, L., 2020). This tool is a freeware, multi-platform corpus analysis toolkit with a host of useful features to analyze large amounts of transcribed data. In the case of this project, the AntConc Word Clusters Tool was used to evaluate student utterances of the target vocabulary. The vocabulary word and its collocates can be specified as a substring, a word, a phrase, or a regular expression and additional words to the left or right of the target word can also be specified. When analyzing the data, however, the differences in the test format necessitated some changes to both corpora as some questions in the first section (asked by the teacher) contained target vocabulary. These words were removed from student utterances in section one to accurately assess students' production rather than their ability to paraphrase questions.

During the data analysis, it was necessary to clearly define what would constitute a 'correct' utterance. As the focus for the interventions was on common collocations, it was deemed essential that students exhibited an ability to use the target vocabulary correctly in context. Kurosaki (2010) created three classifications for student utterances - *Acceptable Collocations*, *Infelicitous Collocations*, and *Wrong Collocations*. *Acceptable Collocations* are defined as utterances that are objectively correct, showing that the student clearly has knowledge of the word and its collocation. *Infelicitous Collocations* are classified as an accurate production of the collocation, but with syntactic problems such as issues with plural nouns and article agreements relating to the use of the collocation within a sentence. In this instance, the student is showing knowledge of the collocation, but is unable to apply it correctly in a sentence. Finally, *Wrong Collocations* are where students' use of the word clearly shows a lack of knowledge of its proper use and/or its collocations.

To provide more detail on student collocation use, the *Acceptable* category was further divided into two categories – *Accurate Target Collocations* and *Accurate Non-Target Utterances*. This allows the data to be differentiated between collocations that were provided to students as part of the course vocabulary lists (and consequently formed the basis of the collocation interventions – *Target Collocations*), and other utterances that are acceptable in spoken English, yet were not taught directly through interventions (*Non-Target Utterances*).

Evaluation of the student utterances based on the four collocation classifications were made by the two researchers in this study (American and British native speakers of English). To reduce potential errors caused by inter-rater reliability, the researchers in this study employed a double coder approach as suggested by Trove, Paquot, and Plonsky (2020). In tandem, both researchers analyzed the data sets together which enabled them to reduce the amount of coding errors and make more explicit decisions when classifying which category students' utterances fall into based on Kurosaki's (2010) predetermined coding scheme (Trove et al., 2020).

The concept of *Infelicitous Collocations* is a key inclusion for this study because students may exhibit knowledge of the original collocation, but the accuracy of their utterance may be hindered by other grammatical or lexical mistakes. Therefore, utterances that exhibit the correct lexical structure required for the collocation (including prepositions and verb forms) yet contain additional errors will be included in this category. Table 4 below gives a clearer sense of the four categories used to assign classifications to student responses. Target vocabulary words are indicated in bold, and their related collocations are underlined.

Table 4

Examples of Student Utterance Classification

Student Utterance (Collocations are underlined and vocabulary is bolded)	Classification	Explanation
... teacher said there is no **connection** between money and happiness...	Acceptable Target	
...even though the effect of that is last only three months but sorry it is uh that has a good **influence** on your happiness...	Acceptable Target	
...**research** shows that people from 60 years old to 64 years old are happier than people from 20 years old to 24 years old.	Acceptable Non-Target	'Research' is used and collocated correctly, however this collocation (research shows that) is not given on the student vocabulary list
...they use that **data** to know the common characteristics of happy people.	Acceptable Non-Target	'Data' has been used correctly, but it has not been used as part of a common collocation
... I think three is not **relevant** to happiness. First, money. Having a lot of money. And second, they are young. And third thing is...	Infelicitous	'Relevant' is collocated correctly, but the collocation has not been used correctly within the sentence. The student made a mistake in the formation of the sentence subject (three things) and with verb agreement (three things are)
it is important for people to set goals to **achieve** easy	Infelicitous	'Achieve' is used correctly, however the student made an error with word form (achieve easily)
Education and use uh also **requirement** of happiness	Wrong	'Requirement of' is not an acceptable collocation in this context
... being rich is um being rich is not, um, **develop** to ourself.	Wrong	The student does not seem to understand the meaning of the target word.

An additional consideration when using AntConc for corpus analysis is to search for related words that would be acceptable such as plural forms of nouns, third-person singular verbs, and past participles. This is because AntConc searches a corpus for exact word matches rather than partial matches. This means that, when searching for the word *connection*, it is also necessary to search individually for *connections*, *connect*, and *connected*.

5 Discussion

5.1 Main findings

The complete analysis of each target word utterance for the intervention and control classes is in Appendix 3. The four classification methods used in the data analysis allow various aspects of the results to be compared. The data was also applied to a wider target population (in this case, the entire cohort of intermediate English A, totalling 384 students) using Wilson Score Intervals with an *a* value of 0.05, meaning that the average for the entire population has a 95% chance to lie within the minimum and maximum range given by the Wilson Score Intervals.

Combining the *Acceptable Target* and *Infelicitous* utterances gives a total of attempted utterances of targeted collocations that were provided to students on vocabulary lists. As outlined in Kurosaki's (2010) classification system, it can be argued that infelicitous utterances are, also accurate for the purposes of collocation analysis. These utterances are classified as such on the basis that the vocabulary is used correctly regarding collocations but cannot be considered correct due to extraneous lexical errors. However, to produce such utterances it can be argued that, despite other issues with their spoken grammatical and lexical accuracy, students are exhibiting knowledge of the target word and how to collocate it correctly (Kurosaki, 2010). Overall, as indicated in Table 5, the intervention groups used an average of 3.36 target collocations, compared to 2.19 for the control groups. When the Wilson Score Intervals are considered, the minimum of the 95% confidence interval for the Intervention groups (2.96 utterances per group) is still higher than the maximum confidence interval value for the control groups (2.78 utterances per group), showing that this result remains statistically significant even when applied to the larger class cohort.

Table 5

Inferential Analysis of Target Collocation Utterances

	Target Collocation Utterances (Acceptable Target + Infelicitous)					
	Observed		95% Wilson Score Interval Max		95% Wilson Score Interval Min	
	Total	# Per Group	Total	# Per Group	Total	# Per Group
Intervention	178	3.36	201	3.79	157	2.96
Control	59	2.19	75	2.78	47	1.74

In response to the proposed research question of determining the impact of interventions on student collocation usage, analysis of the data indicates that supplemental collocation activities seem to have a measurable effect on the accuracy of students' productive collocation usage in speaking. These findings echo previous studies that found students' accuracy in vocabulary increases when they are explicitly taught collocations and provided with opportunities to produce them in varying contexts (Koya, 2003; Ozaki, 2011; Memarian-Morajarab & Farjami, 2020; Pakadaman & Gilakjani, 2019; Webb et al., 2013). Thus, regarding the objective of this class action research study, it can be argued that explicit teaching of collocations and the provision of ample opportunities for practice can have a positive impact on students' collocation accuracy in speaking.

5.2 Additional Findings

Another finding worthy of attention is the overall accuracy of student utterances. This can be calculated by combining the *Acceptable Target* and *Acceptable Non-Target* categories. As the difference between these is merely that *Acceptable Target Collocations* were provided on student vocabulary lists and *Acceptable Non-Target Utterances* were not, both can be considered accurate usage of the targt word in question. As Table 6 indicates, the overall vocabulary accuracy of students who received an intervention was considerably higher, with groups recording an average of 6.13 correct utterances per group, versus an average of 2.70 correct utterances per group for the control groups. When applied to the entire intermediate English cohort, the difference in Wilson Score Intervals still remains significant, with the interval minimum for the intervention groups (5.60 utterances per group) being significantly higher than the interval maximum for the control groups (3.33 utterances per group).

Table 6

Inferential Analysis of Overall Vocabulary Accuracy

	Accurate Vocabulary Usage (Acceptable Target + Acceptable Non-Target)					
	Observed		95% Wilson Score Interval Max		95% Wilson Score Interval Min	
	Total	# Per Group	Total	# Per Group	Total	# Per Group
Intervention	325	6.13	356	6.72	297	5.60
Control	73	2.70	90	3.33	59	2.19

Increased encounters with words have been shown to improve learners' retention of newly learned vocabulary and may improve accuracy during production (DeKeyser, 2007; Memarian-Morajarab & Farjami, 2020; Webb et al., 2013). The increase in target vocabulary use of the experiment group may also indicate that the intervention process helped students to internalize vocabulary to a greater degree, helping bring the target words into the students' lexicon. As collocations are mentally stored in lexical chunks, Pawley and Snyder (1983) believe that learning collocations may reduce the cognitive load and enable students to save processing time when speaking.

A further observation from the data is the increase in attempted utterances across all four categories recorded among the intervention classes, as can be seen in Table 7. While the groups from the control classes attempted an average of 7.55 words per group, the groups from the intervention classes attempted an average of 9.43 words, amounting to a 25% increase in attempted target vocabulary usage. This may indicate that students' increased familiarity with the vocabulary encouraged them to take more risks. Supporting this assumption, Koya (2003) recognized that Japanese students, as opposed to their European English learner counterparts, are more likely to use words or phrases they are confident in using correctly rather than risk making a mistake.

Table 7

Inferential Analysis of Attempted Utterances

	Attempted Utterances					
	Observed		95% Wilson Score Interval Max		95% Wilson Score Interval Min	
	Total	# Per Group	Total	# Per Group	Total	# Per Group
Intervention	500	9.43	538	10.15	465	8.77
Control	219	7.55	247	9.15	194	7.19

However, this increased vocabulary usage within the intervention group differs from the results of the pilot study, where it was observed that, despite displaying increased accuracy, intervention class students did not on the whole attempt to use the target vocabulary more than the control group. This may in part be due to the timing of the pilot study as students were required to use a wider range of vocabulary, the topic of the preliminary study speaking test being different from the main topic of the target unit, and limitations due to the small data set of the pilot study. Additionally, when the Wilson Score Intervals are considered, it may be the case that the average number of utterances attempted by each group are the same for both intervention and control groups, as the maximum interval value for the control groups (9.15) exceeds the minimum interval value for the intervention groups.

5.3 Limitations

When considering the limitations of this study, one key consideration is the context of the data collection. Students were recorded during a speaking test that accounted for 4% of their final grade for the unit. This, combined with the test conditions, is likely to have increased student anxiety which may, in turn, have an influence on student performance. An additional issue related to the context of the data collection arises from the cognitive load that is imposed on students. The rubric for this speaking test stipulated that students must express opinions, ask questions and interact with their partner, agree and disagree with their partner, and use not only target vocabulary but also target grammar points. Accordingly, it is important that the assembled corpora and any data derived from them are viewed as examples of second language learners' speech in a test situation, rather than examples of natural speech. Some consequences of this may have influenced the studies' data set, including less spoken output due to nerves, contrived or forced use of vocabulary, and an overreliance on set phrases that can be directly applied to the topic of the test.

Another consideration that has had a widespread effect on academic research is the continuing influence of the Coronavirus pandemic. As a result, the university has made use of Zoom to protect students and staff and has adapted its class policy as the pandemic has developed. During the preliminary study, all classes were delivered remotely. As a result, the preliminary study interventions and data collection all took place on Zoom. When the expanded study began, the university had implemented a more complicated alternating system of online and in-person class delivery. It should be noted that the complexity of this system may have had some influence on student performances during the study.

This format also influenced the choice of the sample groups, particularly regarding the control groups. It was decided to give priority to the speaking test delivery method, so two classes that were receiving all their instruction on Zoom were included. This is because it was not possible to find additional control group classes that were receiving a combination of online and face-to-face instruction yet would also be taking the speaking test via Zoom.

The absence of a preliminary test to assess students' vocabulary levels before the study could also be considered a limitation in the methodology. The university assigns students to classes in a balanced manner, combining high achieving students with lower-level students across all classes based on their GSE placement test scores and grades from previous semesters. Therefore, university policy ensures that classes will be approximately comparable in terms of English ability. A preliminary test to assess students' ability to use new vocabulary in speaking would enable a more direct comparison of classes' relative speaking abilities.

Other limitations may have arisen from individual teacher approaches to vocabulary instruction, both within the intervention classes and the control classes. Intervention class teachers were provided with clear instructions and materials for use both on Zoom and in the classroom, but there is always the possibility of slight variations in approach depending on the teacher and time constraints within the class. Additionally, it should be mentioned that the researchers in this study accounted for four of the six intervention groups. While teachers all follow the same syllabus and assessments, there are likely to be differences in the delivery of materials and the use of any additional activities from class to class and teacher to teacher. In addition, control class teachers may have given students additional activities other than those in the overall lesson plan to review for the speaking test. However, these additional activities are likely to have improved the performance of the control class students, therefore reducing the measurable effect of supplemental collocation activities on students' productive vocabulary accuracy in speaking.

While considering the effect of individual teachers, it is important to also mention interrater reliability in relation to the classification system used to analyze the data. Kurosaki (2010), who originally proposed classifying utterances as *acceptable*, *infelicitous* or *wrong*, also commented on this. Kurosaki stated that the "results of categorization should be considered as an approximation rather than an absolute judgment" due to the "variations in the norms of ... linguists who judged the collocations produced by the learners" (p. 121). In effect, Kurosaki states that there is likely to be some variation in the classification of collocations depending on the person undertaking the analysis. This reliability could be improved by expanding the analysis team and comparing the findings of multiple researchers across the same data set.

5.4 Future implications

Further study could determine if collocation-based interventions have a measurable influence on students' productive vocabulary accuracy in writing too. Writing samples from the same classes could be obtained and would therefore allow for a comparison with the assembled speaking data. Research into the long-term retention of collocation patterns and vocabulary usage could also be beneficial in determining the overall efficacy of collocation-based vocabulary interventions.

At higher levels of second language competence, research has shown that accurate use of collocations becomes more important for perception of language ability. Therefore, a comparative study of collocation-focused vocabulary activities with higher-level students may provide greater insight into the most effective applications for a collocation-based approach to vocabulary education and practice. Similarly, a study involving lower-level students may also help further illuminate this.

A further avenue of potential research is related to the practical delivery of these interventions as there may be potential to optimize this process even further. Of particular interest from a practical point of view is the effect of shortening the timeframe for the interventions. A shorter process would certainly be desirable for class planning and practical teaching, but the effect that reducing the number of interventions would have on student vocabulary production remains unknown. Ultimately, a compromise between class hours spent and overall productive accuracy will have to be reached.

The assembly of these corpora of spoken English in a Japanese second language perspective creates several possible opportunities for further study. One such avenue is to analyze the nature of the errors in student speech. In particular, errors arising from L1 transfer are thought to be a significant barrier to accurately using collocations in the L2 (Bui, 2021; Ozaki, 2011; Murao, 2004; Nakata, 2007). Scholars believe that one method to improve students' accurate use of newly learned collocations is to raise their awareness of L1 incongruencies (Kurosaki, 2010; Ozaki, 2011). According to several studies of Japanese learner collocation errors, a sizable percentage of L1-associated collocation errors are related to verb errors (Koya, 2003; Kurosaki, 2010; Ozaki, 2011). This finding implies that students could benefit from explicit awareness building of the congruencies and incongruencies of collocations in their L1 and the target language. Other research has supported teaching collocations using the L1 to help improve student awareness of the differences and, eventually, improve their vocabulary accuracy in speaking and writing. Therefore, it can be suggested that future collocation studies could benefit from having students explore the similarities and differences between collocations in their target language and their L1.

5.5 Conclusion

Scholars agree that the study of collocations is necessary for students to develop stronger vocabulary abilities. Furthermore, research has shown that learning collocations has positive impacts on vocabulary accuracy in speaking (Memarian-Morajab & Farjami, 2020; Koya, 2003; Ozaki, 2011; Pakadaman & Gilakjani, 2019; Webb et al., 2013). In the context of vocabulary acquisition in Japanese tertiary education, few existing studies have utilized a collocation-based vocabulary intervention approach; therefore, the results of this classroom action research are hoped to fill a gap in the literature. One primary goal of this study was to identify practical and replicable educational techniques that could help improve accuracy in speaking. In that sense, this study shows that collocation-based vocabulary activities can be an effective method for enhancing students' productive vocabulary accuracy in speaking, and that the intervention techniques can be applied successfully to different classroom or online contexts and delivered by different teachers.

This approach to vocabulary acquisition may prove effective in the context of language education in Japan, where emphasis is often placed on accuracy over productive fluency (Dickinson, 2008; Falout, Elwood, & Hood, 2009; Kikuchi, 2009; Nesselhauf, 2003; Tanaka, 2017), leading to a reluctance to take risks if students are not confident about their ability to produce accurate utterances. Therefore, by increasing accuracy, students can be encouraged to take more risks and express themselves more freely in their second language.

References:

Anthony, L. (2020). AntConc (Version 3.5.9) [Computer Software]. Tokyo, Japan: Waseda University. Available from https://www.laurenceanthony.net/software

Altenberg, B., & Granger, S. (2001). The grammatical and lexical patterning of MAKE in native and non-native student writing. *Applied linguistics*, *22*(2), 173-195. https://doi.org/10.1093/applin/22.2.173

Benson, M., Benson, E., & Ilson, R. (Eds.). (1997). *The BBI dictionary of English word combinations*. John Benjamins Publishing Company. https://doi.org/10.1075/z.bbi1(2nd)

Booij, G. (2012). Construction Morphology and the interaction of syntax and word formation. *Los límites de la morfología. Estudios ofrecidos a Soledad Varela Ortega*, 105-113. https://doi.org/10.15366/l.morfologia2012.005

Bui, T. L. (2021). The Role of Collocations in the English Teaching and Learning. *International Journal of TESOL & Education*, *1*(2), 99-109. DOI: 10.11250/ijte.01.02.006

DeKeyser, R. (Ed.). (2007). *Practice in a second language: Perspectives from applied linguistics and cognitive psychology*. Cambridge University Press. https://doi.org/10.1017/CBO9780511667275

Dickinson, P. (2008). Raising awareness of collocation in the Japanese EFL classroom. *Assignment submitted for Master of Arts in Applied Linguistics*, 6-7.

Ellis, N. C. (2012). Formulaic language and second language acquisition: Zipf and the phrasal teddy bear. *Annual review of applied linguistics*, *32*, 17-44. DOI:10.1017/S0267190512000025

Erman, B., & Warren, B. (2000). The idiom principle and the open choice principle. *Text & Talk*, *20*(1), 29-62. https://doi.org/10.1515/text.1.2000.20.1.29

Falout, J., Elwood, J., & Hood, M. (2009). Demotivation: Affective states and learning outcomes. *System*, *37*(3), 403-417. https://doi.org/10.1016/j.system.2009.03.004

Gass, S. M., & Selinker, L. (2008). Second language acquisition: An introductory course (3rd ed.). New York: Taylor & Francis.

Ghezelseflou, M., & Seyedrezaei, S. H. (2015). An investigation on the impact of teaching vocabulary through collocations on the vocabulary retention of EFL learners. *International Journal of Basic Sciences & Applied Research*, *4*(3), 162-170.

Godwin-Jones, R. (2018). Contextualized vocabulary learning. *Language Learning & Technology*, *22*(3), 1-19. https://doi.org/10125/44651

Hu, H. C. M., & Nassaji, H. (2016). Effective vocabulary learning tasks: Involvement load hypothesis versus technique feature analysis. *System*, *56*, 28-39. https://doi.org/10.1016/j.system.2015.11.001

Jeon, J. (2009). The selection of collocations in media for KFL learners. *KLing*, 3, 39-50.

Khezrlou, S., Ellis, R., & Sadeghi, K. (2017). Effects of computer-assisted glosses on EFL learners' vocabulary acquisition and reading comprehension in three learning conditions. *System*, *65*, 104-116.
https://doi.org/10.1016/j.system.2017.01.009

Kikuchi, K., & Browne, C. (2009). English educational policy for high schools in Japan: Ideals vs. reality. *RELC journal*, *40*(2), 172-191. https://doi.org/10.1177/0033688209105865

Kim, M., Crossley, S. A., & Kyle, K. (2018). Lexical sophistication as a multidimensional phenomenon: Relations to second language lexical proficiency, development, and writing quality. *The Modern Language Journal*, *102*(1), 120-141. https://doi.org/10.1111/modl.12447

Koya, T. (2003). A study of collocation in English and Japanese noun-verb combinations. *Intercultural communication studies, 12*(1), 125-141.

Kurosaki, S. (2010). An analysis of Japanese L2 learners' knowledge of "verb+ noun" collocations. 実践女子大学 FLC ジャーナル, (5), 63-77.

Larsson, T., Paquot, M., & Plonsky, L. (2020). Inter-rater reliability in learner corpus research: Insights from a collaborative study on adverb placement. International Journal of Learner Corpus Research, 6(2), 237-251. https://doi.org/10.1075/ijlcr.20001.lar

Lin, C. C., Chan, H. J., & Hsiao, H. S. (2011). EFL Students' Perceptions of Learning Vocabulary in a Computer-Supported Collaborative Environment. *Turkish Online Journal of Educational Technology-TOJET*, *10*(2), 91-99.

Memarian-Mojarab, M., & Farjami, H. (2020). Comparing the effect of teaching collocations versus single words on speaking fluency and accuracy. International Journal of Research, 8(3), 95-104.

Murao, R. (2004). L1 influence on learners' use of high-frequency verb+ noun collocations. *ARELE: annual review of English language education in Japan*, *15*, 1-10.

Nakata, T. (2006). English collocation learning through meaning-focused and form-focused activities: Interactions of activity types and L1-L2 congruence. In *Proceedings of the 11th Conference of Pan-Pacific Association of Applied Linguistics* (pp. 154-168).

Nunan, D. (2003). Practical english. *Language Teaching. New York: Mc Graw Hill.*

Nesselhauf, N. (2003). The use of collocations by advanced learners of English and some implications for teaching. *Applied linguistics*, *24*(2), 223-242.https://doi.org/10.1093/applin/24.2.223

Pakdaman, S., & Pourhosein Gilakjani, A. (2019). The Impact of Collocation Activities on Iranian Intermediate EFL Learners' Knowledge of Vocabulary. *International Journal of Research in English Education*, *4*(4), 70-82.DOI: 10.29252/ijree.4.4.70

Saito, K., & Liu, Y. (2021). Roles of collocation in L2 oral proficiency revisited: Different tasks, L1 vs. L2 raters, and cross-sectional vs. longitudinal analyses. *Second Language Research*. https://doi.org/10.1177/0267658320988055

Sanguannam, S. (2017). A study on "delexical verb+noun" collocation errors of Thai EFL intermediate and advanced learners. *Journal of Liberal Arts*, 17(2), 59-84.

Tanaka, M. (2017). Examining EFL vocabulary learning motivation in a demotivating learning environment. *System*, *65*, 130-138. https://doi.org/10.1016/j.system.2017.01.010

Vasiljevic, Z. (2008). Teaching vocabulary to advanced Japanese students: A word association approach. *The East Asian Learner*, *4*(1), 1-19.

Webb, S. (2007). The effects of repetition on vocabulary knowledge. Applied Linguistics, 28(1), 46-65. https://doi.org/10.1093/applin/aml048

Webb, S., Newton, J., & Chang, A. (2013). Incidental learning of collocation. *Language learning*, *63*(1), 91-120.
https://doi.org/10.1111/j.1467-9922.2012.00729.x

Wray, A. 2002. *Formulaic Language and the Lexicon.* New York: Oxford University Press.

Yamashita, J., & Jiang, N. A. N. (2010). L1 influence on the acquisition of L2 collocations: Japanese ESL users and EFL learners acquiring English collocations. *Tesol Quarterly*, *44*(4), 647-668.

Zhao, H., & MacWhinney, B. (2018). The instructed learning of form–function mappings in the English article system. The Modern Language Journal, 102(1), 99–119.

Appendixes

Appendix 1 - Expanded Study Vocabulary List

Word	Collocations	Word	Collocations
Achieve	To achieve sb's goal of Ving	Relevant	Relevant to sth
	Achieve success	Requirement	Requirement for sth
Characteristic	Common characteristic	Research	Do/carry out research
	Characteristics of sth		Research into/on sth
Connection	A connection to sth/sb	Strength	To have/find the strength to V
	Close connection	Attitude	Positive/negative attitude
	Connection between A and B		Attitude about sth
Data	Gather/collect data on sth/sb	Significant	Significant for sth/sb
Goal	Set goals		It is significant that S V
	To achieve sb's goal of Ving		Significant difference/effect/increase/decrease
Gratitude	Gratitude towards sb	Develop	Be developed by
	To feel gratitude	Find	To find out sth
Income	To earn income	Effect	To have an effect
	Income from sth		Effect on sth
Measure	N/A		positive/negative/harmful effect
Method	Use a method	Influence	To have an influence on sb/sth
	Efficient method		good/positive/bad/negative influence
Personality	N/A		

Note - No target collocations were given for *measure* and *personality*

Appendix 2 - Expanded Study Intervention Schedule

Every Day - Shadowing - Audio from the textbook

Students were encouraged to repeat after the audio as accurately as possible without looking at the script.

Day 1 - Receptive - Pair Dictation

Students are divided into pairs (A and B), and given different worksheets. These worksheets (an A version and a B version) contain sentences using the target vocabulary and collocations, and blank spaces. Student A reads the sentences on their worksheet to Student B, who writes them down. Students were encouraged to repeat different parts of the sentence as required to help draw attention to the collocations. Once Student A finished, the roles were reversed.

Day 2 - Receptive - Collocation Matching and Gap Fill Activities

Using Nearpod, students given a range of vocabulary activities, including a collocation matching activity were required to pair target vocabulary words with common collocations ('a characteristic' 'of something', 'a connection' 'to something', 'to set' 'goals' etc), and some gap fill questions. Not

only were the target vocabulary words missing, but also related collocations. Students were encouraged to work together to help reinforce the collocated vocabulary patterns. Students who attended classes on campus were given a physical worksheet containing the same activities.

Day 3 - Productive - Structured Interview

Students were divided into pairs (A and B) and given different worksheets. These worksheets (an A version and a B version) contained incomplete sentences for students to finish and corresponding questions for their partner. For example, Sheet A included the question 'What should students focus on when learning English?', and sheet B included the incomplete sentence 'It is important to focus on .... when studying English'.

Day 4 - Productive - Story Relay

Students were put into groups of four and given the story title 'A Crazy Weekend'. Students would then take it in turns to add sentences to the story, passing on to the next student once they had used one of the target vocabulary words. Students were only allowed to use each word once.

Day 5 - Productive - Collocation Discussions

Students were put into pairs and given a discussion topic that directly included target vocabulary and collocations, for example 'Is studying abroad a **requirement** for **developing** your English skills?'.

Day 6 - Productive - Use The Word Game

On Zoom, students were divided into groups of three and given a discussion topic that did not include target vocabulary. While two students discussed the topic, the third student typed target words into the Zoom chat. The discussing pair then tried to use that word in their discussion. After the word was used successfully, the third student would add a new word. After three minutes, the students received a new topic and changed roles within the group.

In the classroom, students worked in pairs and were given a set of vocabulary cards, placed face down in a pile. After being given a discussion topic, students turned over the first card, and began their discussion. When a student successfully used that target word in the discussion, they took that card and turned over the next. After three minutes had passed, students changed partners, reset the cards and were given a new topic.

Day 7 and 8 - Productive - Discussion Grids

Students were given a 3x3 bingo grid containing different target vocabulary words. A range of grids were created to ensure greater variety in student discussion. Then, students were put in pairs and given a short discussion topic. When a student used a target word in discussion, they would mark it on their sheet. After a short time, partners were changed and students received a new topic, while continuing to work from the same bingo sheet.

Appendix 3 – Full Vocabulary Analysis for Intervention and Control Classes

Results for Intervention Classes

	Intervention Class Data							
Word	**Attempted Utterances**	**Utterances Per Group**	**Target Collocation**	**Target Per Group**	**Acceptable Target**	**Acceptable Non Target**	**Infelicitous**	**Wrong**
Achieve	22	0.42	6 / 27%	0.11	0 / 0%	13 / 59%	6 / 27%	3 / 14%
Characteristic	23	0.43	14 / 61%	0.26	8 / 35%	8 / 35%	6 / 26%	1 / 4%
Connection	116	2.19	41 / 35%	0.77	16 / 14%	47 / 41%	25 / 22%	28 / 24%
Data	48	0.91	26 / 54%	0.49	20 / 42%	14 / 29%	6 / 13%	8 / 17%
Goal	80	1.51	27 / 34%	0.51	2 / 3%	50 / 63%	25 / 31%	3 / 4%
Gratitude	15	0.28	3 / 20%	0.06	2 / 13%	7 / 47%	1 / 7%	5 / 33%
Income	59	1.11	5 / 8%	0.09	0 / 0%	46 / 78%	5 / 8%	8 / 14%
Measure	3	0.06	N/A	N/A	N/A	3 / 100%	0 / 0%	0 / 0%
Method	4	0.08	0 / 0%	0.00	0 / 0%	2 / 50%	0 / 0%	2 / 50%
Personality	8	0.15	N/A	N/A	N/A	5 / 63%	0 / 0%	3 / 38%
Relevant	26	0.49	23 / 88%	0.43	21 / 81%	0 / 0%	2 / 8%	3 / 12%
Requirement	7	0.13	4 / 57%	0.08	2 / 29%	0 / 0%	2 / 29%	3 / 43%
Research	18	0.34	3 / 17%	0.06	0 / 0%	12 / 67%	3 / 17%	3 / 17%
Strength	8	0.15	1 / 13%	0.02	0 / 0%	3 / 38%	1 / 13%	4 / 50%
Attitude	17	0.32	13 / 76%	0.25	12 / 71%	0 / 0%	1 / 6%	4 / 24%
Significant	21	0.40	5 / 24%	0.09	5 / 24%	12 / 57%	0 / 0%	4 / 19%
Develop	2	0.04	0 / 0%	0.00	0 / 0%	0 / 0%	0 / 0%	2 / 100%
Find	15	0.28	4 / 27%	0.08	3 / 20%	8 / 53%	1 / 7%	3 / 20%
Effect	3	0.06	1 / 33%	0.02	1 / 33%	1 / 33%	0 / 0%	1 / 33%
Influence	5	0.09	2 / 40%	0.04	2 / 40%	0 / 0%	0 / 0%	3 / 60%
Total	**500**	**9.43**	**178 / 36%**	**3.36**	**94 / 18.8%**	**231 / 46.2%**	**84 / 16.8%**	**91 / 18.2%**

Results for Control Classes

					Control Class Data			
Word	**Attempted Utterances**	**Utterances Per Group**	**Target Collocation**	**Target Per Group**	**Acceptable Target**	**Acceptable Non Target**	**Infelicitous**	**Wrong**
Achieve	8	0.28	3 / 38%	0.10	0 / 0%	2 / 25%	3 / 38%	3 / 38%
Characteristic	3	0.10	2 / 67%	0.07	0 / 0%	0 / 0%	2 / 67%	1 / 33%
Connection	55	1.90	6 / 11%	0.21	4 / 7%	11 / 20%	2 / 4%	38 / 69%
Data	21	0.72	15 / 71%	0.52	7 / 33%	0 / 0%	8 / 38%	6 / 29%
Goal	51	1.76	10 / 20%	0.34	4 / 8%	10 / 20%	6 / 12%	31 / 61%
Gratitude	4	0.14	1 / 25%	0.03	1 / 25%	2 / 50%	0 / 0%	1 / 25%
Income	21	0.72	1 / 5%	0.03	0 / 0%	9 / 43%	1 / 5%	11 / 52%
Measure	2	0.07	N/A	N/A	N/A	2 / 100%	0 / 0%	0 / 0%
Method	4	0.14	2 / 50%	0.07	0 / 0%	0 / 0%	2 / 50%	2 / 50%
Personality	7	0.24	N/A	N/A	N/A	6 / 86%	0 / 0%	1 / 14%
Relevant	5	0.17	2 / 40%	0.07	2 / 40%	0 / 0%	0 / 0%	3 / 60%
Requirement	2	0.07	1 / 50%	0.03	1 / 50%	0 / 0%	0 / 0%	1 / 50%
Research	5	0.17	1 / 20%	0.03	0 / 0%	0 / 0%	1 / 20%	4 / 80%
Strength	2	0.07	0 / 0%	0.00	0 / 0%	2 / 100%	0 / 0%	0 / 0%
Attitude	17	0.59	13 / 76%	0.45	8 / 47%	0 / 0%	5 / 29%	4 / 24%
Significant	2	0.07	1 / 50%	0.03	0 / 0%	0 / 0%	1 / 50%	1 / 50%
Develop	2	0.07	0 / 0%	0.00	0 / 0%	0 / 0%	0 / 0%	2 / 100%
Find	3	0.10	0 / 0%	0.00	0 / 0%	2 / 67%	0 / 0%	1 / 33%
Effect	3	0.10	0 / 0%	0.00	0 / 0%	0 / 0%	0 / 0%	3 / 100%
Influence	2	0.07	1 / 50%	0.03	0 / 0%	0	1 / 50%	1 / 50%
Total	**219**	**7.55**	**59 / 27%**	**2.03**	**27 / 12.3%**	**46 / 21.0%**	**32 / 14.6%**	**114 / 52.1%**