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Examining the Link between Thai L2 University Students' Vocabulary Size and Academic Vocabulary Depth

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ABSTRACT

This study examines the vocabulary size and academic vocabulary depth knowledge among Thai pre-service English teachers, aiming to elucidate the relationship between these dimensions, which are essential for effective teaching. A total of 288 participants, aged 18 to 22, from three universities in northeastern Thailand, were assessed using two primary instruments: the Vocabulary Size Test (VST) and the Academic Vocabulary Knowledge Scale (AVKS). The VST measures participants' receptive vocabulary size through multiple-choice questions, while the AVKS evaluates participants' depth of knowledge regarding 16 specific academic words. To assess the validity and reliability of the measurement tools, Rasch analysis was employed, emphasizing four core principles: unidimensionality, local independence, reliability, and model-data fit. The findings reveal that participants demonstrate a moderate average understanding of academic vocabulary, with significant variability in the depth of knowledge across different words. Correlation analysis reveals a weak positive relationship between vocabulary size and academic vocabulary depth, indicating that as vocabulary size increases, academic vocabulary knowledge tends to improve, albeit modestly. Despite these findings, the results highlight the need for improved vocabulary teaching strategies to fully develop both dimensions in pre-service teachers, which is crucial for success in the academic and professional aspects of English language learning. The study offers valuable insights and underscores the importance of integrating both vocabulary size and depth into language education curricula.

Keywords: Academic Vocabulary Depth; Rasch Analysis; Thai Pre-service Teachers; Vocabulary Size

1. Introduction

Vocabulary forms a fundamental part of mastering a language, extending far beyond simply knowing a word's definition. It involves understanding not only the word's form, whether spoken, written, or morphological, but also its meaning, which includes the relationships between form and meaning, conceptual understanding, and associations. Additionally, vocabulary knowledge encompasses its use in various contexts, such as grammatical roles, collocations, and contextual constraints, across both receptive and productive language activities. Nation[1] identifies four core components of vocabulary knowledge: breadth, depth, strength, and integration. This comprehensive framework has been widely researched, with numerous studies shedding light on the intricate and multifaceted nature of vocabulary acquisition[2–6].

Understanding both vocabulary size and depth is essential for learners to accurately distinguish a word's meaning and form. Vocabulary size, also referred to as the breadth of vocabulary knowledge, represents the number of words that a second language (L2) learner can recognize and understand[7–9]. It indicates the size of a learner's vocabulary and serves as an index to their general proficiency in language. Vocabulary depth, on the other hand, reflects the extent to which a learner understands a word's full range of meanings and uses, which reveals how deeply they grasp the lexicon[10]. As Read[11] argues, knowing a word involves more than just superficial understanding; it also requires knowledge of its features, syntax, collocations, and appropriate contexts. Both size and depth can be understood through their receptive and productive dimensions. Research has shown that a larger vocabulary size does not necessarily guarantee effective language use. Simply knowing a large number of words does not ensure proficiency in their application[1,3,12]. A significant relationship has been established between vocabulary size and depth, underscoring the interconnected nature of these two dimensions of vocabulary knowledge[13]. Understanding these relationships enhances our insight into vocabulary acquisition and can inform the development of more effective vocabulary assessments that accurately measure both size and depth.

Previous studies have also explored the relationship between vocabulary knowledge and L2 speaking ability. For instance, research has shown that receptive vocabulary size can predict overall L2 speaking proficiency, whereas receptive vocabulary depth does not; however, productive vocabulary knowledge predicts fluency and coherence in speaking[14]. This suggests that interactive engagement with vocabulary contributes to both the size and depth of a learner's vocabulary knowledge. Similarly, listening performance has been found to be more strongly predicted by the breadth of vocabulary knowledge than by its depth[15]. In contrast, both vocabulary size and depth are strongly correlated with reading performance, with depth being a stronger predictor[16].

Regarding academic vocabulary, previous research indicates a strong correlation between vocabulary size and depth. For example, Akbarian[13] investigated the relationship between vocabulary size and depth among 112 Iranian graduate students using the Vocabulary Levels Test (VLT) for size and the Word Association Test (WAT) for depth. The study found a significant correlation ($R^2 = 0.746$) between these two dimensions. However, little is known about how vocabulary size relates to the depth of academic vocabulary in specific contexts. This gap in the literature is the focus of the current study, which examines the relationship between vocabulary size (as measured by the Vocabulary Size Test, VST) and academic vocabulary depth (as measured by the Academic Vocabulary Knowledge Scale, AVKS) among Thai pre-service English teachers. This study aims to fill the gap left by previous research, which has chiefly addressed these aspects in isolation[12,14,17–20].

2. Literature Review

2.1. The Link between Vocabulary Size and Depth

The well-documented connection between vocabulary breadth and depth has been demonstrated in several areas of second language (L2) learning. These two aspects of vocabulary knowledge (size and depth) serve as the basis for learners' performance across the four language skills (reading, listening, speaking, and writing). However, their predictive value may differ considerably according to the specific skill examined.

In reading research, the literature neatly converges around findings that size and depth are key dimensions affecting comprehension. Şen and Kuleli[16], for instance, have found significant relationships between reading performance

and both size and depth of vocabulary, depth being the best predictor. They utilized the Vocabulary Size Test (VST)[21] and Word Association Test (WAT)[22] as indices of breadth and depth. Likewise, Marzban and Hadipour[23] applied the VST, WAT, and the Lexical Inferencing Task to validate the near relationship between reading proficiency and vocabulary in learners, while also indicating the complementary function of both dimensions in terms of reading performance.

Vocabulary also plays a key role in listening and speaking, making the question of what matters more — depth or breadth — subtler. Han and Qian[15] used the VLT[24] and WAT[22] in a sample of 137 Chinese EFL students, as well as the TOEFL listening sub-test. Their findings showed that the breadth was a better predictor of listening comprehension than depth, supporting the influential role of lexical coverage in speech processing. On the other hand, Janebi Enayat and Derakhshan[14] found that vocabulary size and depth could predict various aspects of L2 speaking capability. They reported that receptive vocabulary size uniquely contributed to the lexical dimensions of speaking, whereas receptive depth did not. On the other hand, productive vocabulary knowledge was highly correlated with fluency and coherence in production oral tasks, highlighting the multiple roles of words in oral performance.

The benefits of vocabulary knowledge are also apparent for writing. Dabbagh and Janebi Enayat[25] found that overall performance in descriptive writing was significantly predicted by vocabulary size. More specifically, breadth predicted the vocabulary factor; depth was only weakly related to it. They also reported that knowledge of mid- and low-frequency words significantly contributed to writing performance in the VST, WAT, and two descriptive writing tasks. Likewise, Wu et al.[26], in a study involving 267 Chinese EFL junior high school students, found that measures of vocabulary breadth and depth correlated significantly with writing ability, demonstrating even stronger relationships between the two dimensions and the productive use of the language.

Overall, the data suggest that the size and depth of vocabulary are closely connected, but they make distinct contributions to each of the four core language areas. Vocabulary breadth provides lexical coverage for understanding, whereas depth is related to the proficiency of learners in manipulating words flexibly, accurately, and appropriately in a given context. Nevertheless, only a few studies have investigated the relationship between vocabulary size, as a measure of general word knowledge, and the depth of academic vocabulary in semi-technical word knowledge. Filling in this gap, the current study aims to propose a relationship between the two dimensions that could lead to new insights into their joint role in L2 acquisition.

2.2. Academic Vocabulary Depth Knowledge

Academic vocabulary is conceptualized as the subtechnical or semi-technical words[10]. This vocabulary lies between common, high-frequency words and highly specialized, discipline-specific terms. Once students have mastered the 2,000–3,000 most frequently used words in English, they should also learn vocabulary that relates to their specific interests and academic needs[1]. Academic words are believed to occur around 9% of running words in academic texts, according to the Academic Word List (AWL) proposed by Coxhead[27]. In contrast to Davies and Gardner's[28] level-based Academic Vocabulary List (AVL), which is based on a high-frequency base, the AWL was developed independently, reflecting its role in supporting academic literacy.

Academic vocabulary is associated with formality and scholarly sophistication[29]. It often includes, but is not limited to, the language of the research process, analytical and methodological terminology, as well as evaluative expressions that enable writers to be critical, comparative, and synoptic[30]. Despite its importance, the researchers who have studied effective pedagogical practices of academic vocabulary instruction in particular contexts called for continued research on how to facilitate academic word learning[31]. Such testing could be conducted with learners at various proficiency levels, and combined with morphological instruction[32] as well as with diagnostic tools and assessments that provide more effective support for in-depth insights into learners' academic vocabulary knowledge[27].

To address these lacunae, the current study explores Thai EFL pre-service teachers' (both L2 university learners and future educators) depth of academic vocabulary knowledge. Since they are expected to work with academic texts and produce scholarly writing in both professional and educational settings, enhancing their academic vocabulary is essential for academic success and professional development. Hence, the research is guided by the following three questions.

1. How many word families do Thai pre-service English teachers receptively know?
2. How well do Thai pre-service English teachers know academic vocabulary?
3. What is the relationship between vocabulary size and the academic vocabulary depth of Thai pre-service English teachers?

3. Materials and Methods

3.1. Participants and settings

This cross-sectional study collected the data using convenience sampling from 288 Thai pre-service English teachers in three universities in northeastern Thailand. These participants, aged between 18 and 22 years, have been studying English as a compulsory subject for at least fifteen years. The participants are required to complete a four-year degree program as mandated by the Thai Qualifications Framework for Higher Education (TQF), culminating in a teaching practicum in regional schools during their final year. While most of their coursework is conducted in Thai by Thai English teachers, listening and speaking courses are taught in English by native English speakers, providing them with approximately 20 hours of English exposure per week. However, their overall English exposure outside the classroom is limited. By the end of their academic program, all participants are expected to achieve a minimum CEFR level of B2 to qualify for a teaching license.

3.2. Target word selection

A list of 16 target words was created following a systematic process to select the vocabulary for the study. First, the words that co-existed in the 570-word families from both the Academic Word List (AWL)[27] and the Academic Vocabulary List (AVL)[28] were compared, resulting in 273 shared word families. Next, one member of the word family had to be verified at the B2 level of CEFR, leaving 222 in the target list. As verbs are often considered the root word or base[33], care was taken to select the verb form. Based on this criterion, 148 words were eliminated because their verb forms did not meet the B2 level requirement, leaving 74 words in the target list. The final step in the selection process was to ensure that each word had a range of derivational

forms (verbs, nouns, adjectives, and adverbs). After this final check, the list was refined to include the 16 target words used in the study, as follows: structure, specify, function, select, vary, interact, demonstrate, integrate, construct, perceive, emphasize, restrict, justify, evolve, shift, and exclude.

3.3. Research Instruments

3.3.1. Vocabulary Size Test (VST)

The Vocabulary Size Test (VST)[21] was originally inspired by Read and Chapelle's framework[34]. The Vocabulary Size Test is a multiple-choice vocabulary test that is discrete, selective, and relatively context-independent. The test is offered in both monolingual and bilingual formats and is capable of evaluating vocabulary knowledge up to the 20th 1,000-word level. Participants are required to choose the most accurate definition or translation of each word from four given options. It is available in both printed and digital (computer-based) formats. There are versions containing 14,000 items and 20,000 word families available. This 140-item multiple-choice test features 10 items per 1,000-word family level. A learner's overall receptive vocabulary size is determined by multiplying their total score by 100[21]. Specifically, this study uses a 20,000-word family version, including 100 items. Test takers' vocabulary knowledge in word families is estimated by multiplying their score by 200. The test is timed at 30 minutes. The example of the Vocabulary Size Test[21] is as follows.

> see: They <saw it>.
> a. closed it tightly.
> b. waited for it.
> c. looked at it.
> d. started it up.

The internal reliability of the VST, administered to 288 participants, was assessed using Cronbach's alpha, which yielded a value of 0.869, indicating a good level of reliability. All 100 items demonstrated acceptable fit, with infit and outfit statistics falling within the range of 0.5 to 1.5, as illustrated in **Figure 1**.

Analysis of the design value indicated that the 100-item VST was mainly unidimensional. The eigenvalue (5.59) of the first contrast suggested that secondary factors might be relevant; however, additional evidence, such as the Q3 correlation matrix, supported the assumption of unidimen-

sionality. Additionally, person reliability was high, at 0.883 ($p < 0.001$), indicating a strong level of test-retest stability. Taken together, these results provide strong evidence for the validity and measurement quality of the 100-item VST as an instrument to measure vocabulary size in L2 university students.
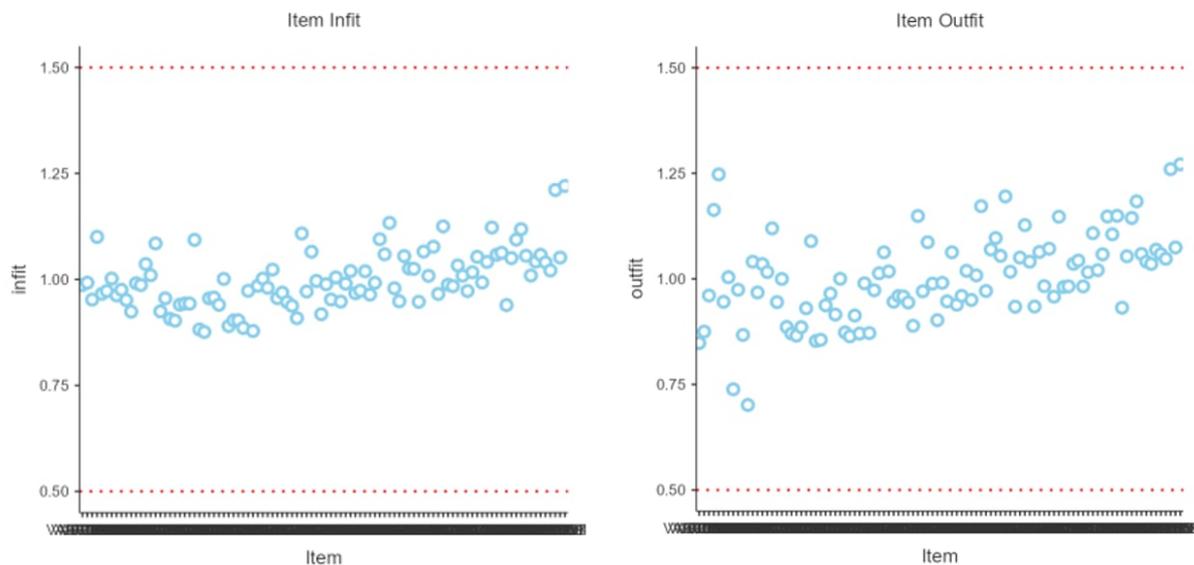

Figure 1. Item Infit and Outfit Plot of the Vocabulary Size Test.

3.3.2. The Academic Vocabulary Knowledge Scale (AVKS)

The vocabulary knowledge scale was initially developed from Wesche and Paribakht's [35] version. In this version, the test asked test-takers to rate their familiarity with the word on a five-level scale. Some criticism of VKS is noted, including the issue of linearity [36]. It is suggested that it cannot distinguish between levels III and IV, which seem to be nominal rather than ordinal, as proposed by the VKS. This current study followed the VKS format proposed by Zhong [37]. The modified vocabulary knowledge scale is appropriate due to its polytomous scoring method, where test takers are required to rate their familiarity with four levels. The example is provided as follows:

academic

I.   I don't remember I have seen or heard of this word before.
II.   I have seen or heard this word before, but I don't know what it means.
III. I think I know this word. It means _____.
(IV.) I can use this word effectively in my sentence writing. The professor encouraged students to use academic sources in their research papers. (The circle shows how the test-taker selected the correct answer.)

As the most frequently occurring forms, the headwords were used as the prompt words [38]. Additionally, there are four nonwords alongside the real words. Participants who judge a nonword at levels III or IV are eliminated from the study. Since nonwords are English-like by purpose, participants who rate themselves as having seen a nonword before at level II are not eliminated from the study [38]. Nonwords like acklon, haque, hoult, and aistrope were selected from a set of 16 used in Pellicer-Sánchez and Schmitt [39].

The internal reliability of the AVKS, administered to 288 participants, was assessed using Cronbach's alpha, which yielded a value of 0.877, indicating a good level of reliability. All 16 items demonstrated acceptable fit, with infit and outfit values ranging from 0.5 to 1.5, as illustrated in **Figure 2**.

The eigenvalue was also examined, and the 16-item AVKS appeared largely unidimensional (eigenvalue = 2.57), with only minimal indications of multidimensionality. The Q3 matrix demonstrated independence among items, with no notable correlation patterns, and the person reliability was reported as 0.885 ($p = 0.003$). Thus, the 16-item AVKS was validated for its high quality to assess the academic vocabulary depth of L2 university students.
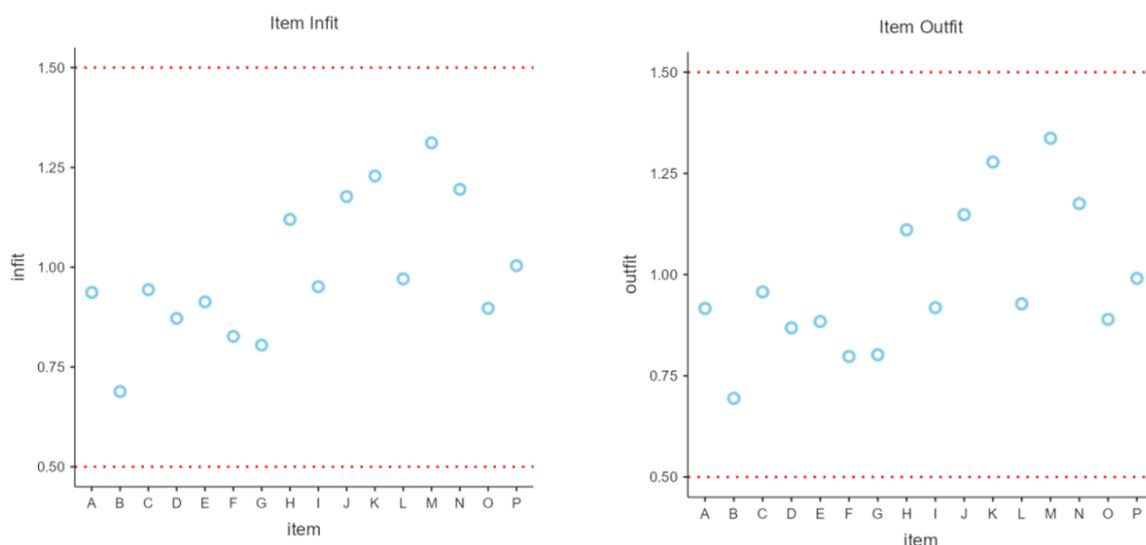
Figure 2. Item Infit and Outfit Plot of the Academic Vocabulary Knowledge Scale.

3.4. Data collection

Ethical approval for this study was secured from the Institutional Review Board of Mahasarakham University (Protocol Code: 107-795/2025; Approval Date: 19 February 2025) via an expedited review process before data collection. Consent was obtained from all participants before they completed the two tests. Participants could withdraw from the study at any time without any risk of failure or negative consequences. The depth vocabulary knowledge (AVKS) is administered before the vocabulary size test (VST), with a time allocation of 30 and 15 minutes, respectively. A 10-minute break is allocated to freshen up the participants. Both comprehensive instructions and examples are clearly explained in the Thai native language to minimize the possibility of misunderstanding before taking the test. Moreover, during the data collection process, test papers with left blanks and those that repeated the same answer for ten consecutive questions would be eliminated to avoid data contamination and ensure the validity of the data analysis.

3.5. Data analysis

The validity and reliability of the instruments were assessed based on Rasch measurement analysis of scores from two vocabulary tests. The fit was determined according to the central assumptions of the Rasch model by assessing unidimensionality, local independence, reliability, and item fit[40]. The analyses were performed using Jamovi 2.6.26 software. The fit of the model was inspected using infit and outfit mean-square statistics, with acceptable values considered to be between 0.5 and 1.5. Factor analysis provided additional evidence for unidimensionality, suggesting that the tests indexed a single construct. Local independence was assessed using correlation matrices (i.e., Q3 coefficient) to determine that items were locally independent and that residual correlations were minimal. Reliability was measured using person reliability indices, which indicate the internal consistency of the instruments[42].

Descriptive statistics (means, standard deviations, skewness, and kurtosis) and Rasch-based validation were performed to explore the related distributional properties and central tendencies of the data. Finally, correlation analyses were performed to investigate the correspondence between test results, where effect sizes are interpreted based on Cohen's[43] guidelines as small (r = 0.10 to 0.29), medium (r = 0.30 to 0.49), or large (r = 0.50 to 1.0).

4. Results and Discussion

4.1. Vocabulary Size of Thai Pre-service English Teachers

The findings indicate that 288 Thai pre-service English teachers receptively know approximately 45.10% of VST, as shown in **Table 1**.

Table 1. Descriptive statistics for VST and AVKS.

	Mean (%)	S.D.	Min	Max	Skewness	Kurtosis
VST	45.1	12	24	99	1.48	3.38
AVKS	45.6	7.8	0	44	0.102	1.31

* n = 288.

To interpret the result, the obtained score was multiplied by 200, resulting in an estimated vocabulary size of 9,020 word families[21]. This suggests that their vocabulary size falls within the mid-frequency range, covering between 3,000 and 9,000 word families. At this level, vocabulary acquisition typically occurs through reading mid-frequency texts and using intentional learning strategies[21]. In contrast to the estimated 20,000 word families known by an educated native English-speaking adult[44], Thai pre-service teachers perform reasonably well. However, this finding contrasts with a previous study suggesting Thai secondary teachers have a vocabulary size closer to the A2 level[45].

Despite these findings, the VST assumes no correction for guessing, which may potentially inflate scores, as a correct guess could represent up to 200 word families[46]. This issue is supported by the significant impact of guessing observed in the VST[47]. Additionally, the multiple-choice format may further inflate scores, as studies show that guessing can lead to inaccurate assessments of vocabulary knowledge[48]. Recent research suggests that the updated vocabulary level tests (UVLT) offer a more accurate measure of vocabulary size by considering frequency levels. Webb et al.[49] argue that performance at individual test levels provides more meaningful insights than overall scores. They emphasize the importance of mastering high-frequency words, as the top 1,000 words account for 75–85% of English usage, and the most frequent 3,000 words ensure 95% comprehension in spoken contexts. Moreover, awareness of their vocabulary level enables students to study more effectively at that level and observe their improvement toward greater vocabulary mastery. Therefore, the UVLT[49] appears to be more effective in measuring vocabulary size for future studies.

4.2. Academic Vocabulary Depth of Thai Pre-service English Teachers

According to AVKS, the total number of items is 20, consisting of 16 target words and four non-words. Initially, none of the 288 participants claimed to know four non-words. The mean raw score is 21.9 out of 48 (45.6%), with scores ranging from under 26% to over 68% as shown in **Table 2**.

Table 2. Self-rating of academic vocabulary depth.

Academic Vocabulary Depth				0		1		2		3	
Prompt words	Score/Total	Mean (%)	S.D.	No.	%	No.	%	No.	%	No.	%
selected	588/864	68.06	0.86	14	4.86	58	20.14	118	40.97	98	34.03
structure	567/864	65.63	0.97	28	9.72	56	19.44	101	35.07	103	35.76
function	549/864	63.54	0.95	26	9.03	65	22.57	107	37.15	90	31.25
specific	513/864	59.38	0.87	19	6.60	90	31.25	114	39.58	65	22.57
interaction	473/864	54.75	0.93	24	8.33	123	42.71	73	25.35	68	23.61
evolution	460/864	53.24	0.95	36	12.50	104	36.11	88	30.56	60	20.83
constructing	403/864	46.64	0.76	22	7.64	156	54.17	83	28.82	27	9.38
demonstrated	396/864	45.83	0.97	55	19.10	117	40.63	69	23.96	47	16.32
varied	374/864	43.29	0.8	40	13.89	144	50.00	82	28.47	22	7.64
shifts	323/864	37.38	0.75	48	16.67	175	60.76	47	16.32	18	6.25
excluded	301/864	34.84	0.77	63	21.88	165	57.29	44	15.28	16	5.56
integrating	299/864	34.61	0.63	40	13.89	208	72.22	29	10.07	11	3.82
emphasis	293/864	33.91	0.7	55	19.10	186	64.58	34	11.81	13	4.51
perceptions	288/864	33.33	0.62	49	17.01	197	68.40	35	12.15	7	2.43
restricted	252/864	29.17	0.68	80	27.78	171	59.38	30	10.42	7	2.43
justifications	227/864	26.27	0.7	99	34.38	159	55.21	22	7.64	8	2.78

* n = 288.

Participants are more familiar with words that have higher mean scores, such as "*selected*," "*structure*," and "*functio*n," with percentages of around 60% or higher. These words are likely more commonly understood or recognised by the participants, unlike words with lower mean scores, such as "*justifications*," "*restricted*," and "*emphasis,*" which

are words where participants have less depth of knowledge, with percentages below 30%. This variability is likely influenced by the frequency levels of academic words in the AWL and AVL, as shown in **Table 3** below.

Table 3. Academic vocabulary in different lists.

Target words	BNC/COCA list	GSL	AWL Sublist	AVL Rank
selected	2	3	2	137
structure	3	3	1	71
function	3	3	1	114
specific	2	3	1	75
interaction	3	3	3	165
evolution	3	3	5	451
constructing	3	3	2	268
demonstrated	3	3	3	199
varied	3	3	1	157
shifts	2	3	3	478
excluded	3	3	3	547
integrating	3	3	4	219
emphasis	3	3	3	312
perceptions	3	3	2	305
restricted	3	3	3	324
justifications	3	3	3	394

Table 3 highlights participants' greater familiarity with high-frequency academic words, as indicated by higher percentages for words that appear more frequently in the AWL[27] and AVL[28]. The correlation analysis below supports this observation.

Table 4 demonstrates a significant relationship between academic vocabulary depth knowledge and the frequency levels of the AWL and AVL. The correlation analysis revealed that the percentage of academic words known was significantly and negatively correlated with both the AWL ($r = -0.447$, $p <$ 0.05) and the AVL ($r = -0.668$, $p < 0.01$), indicating that the participants knew a higher percentage of words as the word frequency decreased. Furthermore, a strong positive correlation between AWL and AVL (Pearson correlation = 0.661, $p = 0.003$) indicates that both lists share a similar focus on academic vocabulary. This finding aligns with Masrai and Milton's study[50], which showed that 570 word families from the AWL are highly frequent and follow a frequency-determined progression. As a result, words are acquired based on their frequency, with more common words learned first.

Table 4. The correlation matrix of the 16-item academic words in different lists.

		Percentage	BNC/COCA	AWL	AVL
Percentage	Pearson Correlation	1	-0.339	-0.447*	-0.668**
	Sig. (1-tailed)		0.100	0.041	0.002
BNC/COCA	Pearson Correlation	-0.339	1	0.215	0.113
	Sig. (1-tailed)	0.100		0.212	0.338
AWL	Pearson Correlation	-0.447*	0.215	1	0.661**
	Sig. (1-tailed)	0.041	0.212		0.003
AVL	Pearson Correlation	-0.668**	0.113	0.661**	1
	Sig. (1-tailed)	0.002	0.338	0.003	

*. Correlation is significant at the 0.05 level (1-tailed).
*. Correlation is significant at the 0.01 level (1-tailed).

The percentages of overall scores for both academic vocabulary size and depth were below 50, indicating that pre-service teacher students' academic vocabulary knowledge was relatively low. This finding also supports other studies that have argued that university students' understanding of academic vocabulary is not adequately controlled[51]. The consistently poor performance on diverse format-based instruments continues to confirm earlier arguments that learning word definitions and spellings does not necessarily reflect a deep or functional understanding of academic vocabulary[53–55].

One possible explanation for this observation is the scarcity of explicit teaching methods that specifically focus on teaching academic vocabulary in context. Especially, aca-

demic word use in sentence-level writing, as reflected by Level IV of the AVKS, seems to receive little attention in instruction[56]. The importance of explicit instruction in academic vocabulary may be overlooked in pedagogy, which often relies on incidental acquisition and fails to provide adequate scaffolding or supported practice[57]. To fill this gap, the present finding argues that sentence-writing tasks should be included in vocabulary teaching. This finding supports Teng's[58] result that the sentence writing condition benefits vocabulary learning.

A second reason for the low scores is that academic vocabulary is inherently challenging. These types of words often occur in more crowded, complex contexts and are the kind of texts in which learners have less contextualized information from which to infer meaning[59]. Moreover, this finding may be attributed to the in-process mental effort required during the acquisition of new lexis and content coverage when learning unknown academic words, rather than overloading learners' cognitive resources or interfering with L2 vocabulary learning[60].

Taken together, the current findings suggest that explicit instruction in academic vocabulary should be a priority for teacher preparation programs in EFL environments. Structured opportunities for sentence-level tasks, along with scaffolding strategies to promote understanding and the practical application of interventions, will be necessary to foster in-depth knowledge of academic vocabulary.

4.3. The Relationship between Vocabulary Size and Academic Vocabulary Depth

According to the relationship between vocabulary size and academic vocabulary depth in Thai pre-service English teachers, the analysis revealed a weak correlation between vocabulary size and academic vocabulary depth, as presented in **Table 5** below.

Table 5. The correlation between VST and AVKS.

		VST	AVKS
VST	Pearson Correlation Sig. (1-tailed)	1	0.226[**] 0.000
AVKS	Pearson Correlation Sig. (1-tailed)	0.226[**] 0.000	1

[**]. Correlation is significant at the 0.01 level (1-tailed).

Table 5 illustrates the correlation between the Vocabulary Size Test (VST) and the Academic Vocabulary Knowledge Scale (AVKS). The results indicate a positive correlation between the two variables ($r = 0.223$, $p < 0.001$). The results showed a small but statistically significant positive correlation between vocabulary size and academic vocabulary depth. This finding aligns with previous studies indicating that different aspects of word knowledge are interrelated[6,37,61,62], reflecting a network of interconnected vocabulary components[6].

Vocabulary size significantly facilitates academic comprehension, as suggested by Evans and Green[51]. The findings indicated that students with an average vocabulary size of 16,117 words had a firm grasp of academic vocabulary, and vocabulary size also reduces the need for additional pedagogical interventions. Additionally, vocabulary size has been shown to significantly impact academic performance, with general vocabulary size accounting for the greatest variance in academic success factors. However, academic and specialist vocabulary also contribute uniquely to academic achievement[63].

An explanation for the low to moderate correlation between vocabulary size and academic vocabulary depth may reside in the discrepancy in the word frequency distribution of both measures. Vocabulary Size Test (VST)[21], which samples 100 words according to frequency, with ten words for each increasing thousand-word frequencies up to 20,000. On the other hand, academic words often cluster in the third to fifth 1,000-word frequency bands[7,8]. The incompatibility between the VST's general frequency-based approach and the narrower VSK focus from that of the Academic Vocabulary Knowledge Scale (AVKS) may also help explain why these two measures are only modestly related.

Another possible account relates to the unique character of constructs measured. The VST primarily measures receptive knowledge, focusing on learners' recognition of word meanings out of context[21]. In contrast, the AVKS focuses on productive knowledge, especially at Level IV, where

students are required to apply academic vocabulary in appropriate contexts[37]. Therefore, these measures, although both measure vocabulary knowledge, tap into different aspects of this: spanning breadth versus depth, and recognition to production, as well as general to academic. From a conceptual and methodological perspective, these differences can account for the fact that the correlation, although significant, was only modest in strength, thus indicating that vocabulary size and academic vocabulary depth have a partly independent status as facets of lexical competence.

The present results have several implications for vocabulary research and instruction. Regarding assessment, the weak relationship highlights the importance of using multiple instruments to measure vocabulary knowledge, as reliance on a single instrument may result in an incomplete profile of learners' lexicons. From an instructional perspective, the results of this study highlight the importance of striking a balance between depth and breadth in vocabulary instruction. Although overall comprehension is facilitated by building a broad lexical base, explicit instruction in academic vocabulary through contexts and productive tasks, such as writing sentences, remains critical for deepening learners' networks of causes and relationships alongside academic literacy. In EFL settings, this dual purpose can carry even greater importance for pre-service teachers, considering that their own proficiency in academic vocabulary not only benefits them as learners but also predicts their ability to attend to their students' L2 learning needs appropriately.

5. Conclusions

The present study investigated the receptive vocabulary size, academic vocabulary knowledge, and the relationship between these two constructs among Thai pre-service English teachers. The results of the study demonstrated that, in terms of high-frequency words, participants knew around 9,020 word families (45.10%) as average-to high-frequency words. Although this indicates a reasonably good lexical base, the VST format may have resulted in slightly higher scores due to guessing. In the field of academic vocabulary, the pre-service teachers presented an attainable knowledge depth (45.62%), whereas several items of general use in text-based tasks (e.g., "structure" and "function") were comprehended with ease; however, unfamiliar or low-frequency

items (e.g., "justifications" and "restricted") caused trouble. This variability results from word-frequency effects and limited exposure to low-frequency academic items. A small but significant relationship was found, revealing a moderate, positive relationship between vocabulary size and academic vocabulary depth: broader vocabulary knowledge weakly underpins deeper academic word knowledge. These results suggest that teacher education programs must explicitly include context-specific instruction in academic vocabulary as part of teachers' literacy development for professional and pedagogical success.

6. Implications and Limitations

This study carries significant implications for teaching and learning practices, particularly in teaching academic vocabulary to Thai pre-service English teachers. It highlights the need for targeted instruction to enhance both vocabulary size and depth, necessitating comprehensive strategies that promote word acquisition and enhance understanding in academic contexts. By integrating academic vocabulary into the curriculum and utilising assessment tools such as the Vocabulary Size Test (VST) and the Academic Vocabulary Knowledge Scale (AVKS), educators can more effectively assess students' strengths and weaknesses, enabling more personalised instruction. Newer vocabulary size measures, such as the UVLT[49], should be considered for future assessments of vocabulary size. Additionally, incorporating academic vocabulary into reading and writing activities can improve students' proficiency in complex language use. Supporting lower-proficiency learners with resources and workshops focusing on high-frequency academic terms is crucial. This study fills a significant gap in the literature. It lays the groundwork for future research on vocabulary knowledge and academic performance, advocating for evidence-based curriculum design to enhance educational outcomes for pre-service teachers in Thailand. However, the sample may not represent all L2 learners in Thailand, limiting generalizability. Additionally, the focus on academic vocabulary may overlook other essential vocabulary dimensions, and the tests may not capture all aspects of vocabulary knowledge. Future research should consider diverse learner populations and longitudinal approaches to address these limitations.

Author Contributions

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Mahasarakham University (protocol code 107-795/2025; date of approval: 19 February 2025).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon request.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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