
| RESEARCH ARTICLE

Breadth–Depth Interaction in ESP Vocabulary among Moroccan Mid-Professional Tourist Agents: Instructional Focus and Insights from the Dual-Route Cascaded Framework

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| ABSTRACT

This study investigates the breadth–depth interaction in English for Specific Purposes (ESP) vocabulary among Moroccan mid-professional tourist agents (MPTAs). A long-standing debate in vocabulary research concerns whether vocabulary breadth and depth represent distinct dimensions or different manifestations of a single underlying construct. To explore this issue, two instructional experiments were conducted in Marrakech (N = 10) and Agadir (N = 18). Results from the breadth-oriented experiment in Marrakech revealed a high vocabulary uptake rate of 6.67 words per contact hour, significantly exceeding the established benchmarks of 3.8 to 5.4 words per hour (Milton, 2009). However, despite these gains, statistical analysis yielded a weak correlation ($r = 0.29$) and high variance ($SD = 27.66$), suggesting uneven development across lexical dimensions. This pattern may be consistent with reliance on the direct lexical route proposed by the Dual-Route Cascaded (DRC) model (Coltheart et al., 2001), whereby rapid form–meaning mappings develop without corresponding growth in qualitative word knowledge. In contrast, the depth-oriented instruction in Agadir produced a very strong correlation ($r = 0.94$), indicating a substantially stronger relationship between vocabulary breadth and depth. This pattern may reflect a greater degree of statistical stability and more integrated lexical development, although further research is required to verify the cognitive mechanisms involved. Overall, the findings suggest that the breadth–depth relationship may be sensitive to instructional emphasis. Nevertheless, given the relatively small sample sizes, participant attrition across post-tests, and the wide confidence interval observed in the breadth-oriented condition, the findings should be interpreted cautiously and regarded as exploratory rather than conclusive. The study contributes to ongoing discussions concerning the dimensionality of vocabulary knowledge and highlights the potential role of instructional focus in shaping lexical development among learners in specialized ESP contexts.

| KEYWORDS

Vocabulary breadth; Vocabulary depth; English for Specific Purposes (ESP); Instructional focus; Vocabulary dimensionality; Dual-Route Cascaded (DRC) model

| ARTICLE INFORMATION

ACCEPTED: 30 June 2026

PUBLISHED: 06 July 2026

DOI: 10.32996/jeltal.2026.8.8.7

1. Introduction

Vocabulary occupies a central position in second language acquisition and English for Specific Purposes (ESP). Without an adequate lexical repertoire, learners encounter substantial difficulties in comprehension, communication, and professional performance. As vocabulary research has expanded, increasing attention has been devoted not only to the quantity of words learners know but also to the quality of their lexical knowledge.

This distinction has generated one of the most enduring debates in vocabulary studies: the relationship between vocabulary breadth and vocabulary depth. Vocabulary breadth generally refers to the number of words a learner knows, whereas vocabulary depth concerns how well those words are known, including semantic, morphological, syntactic, orthographic, and collocational

dimensions of lexical knowledge. Although these dimensions are widely recognized in the literature, researchers continue to disagree about the nature of their relationship.

One perspective, often described as the multidimensional view, treats breadth and depth as distinct but related constructs that contribute independently to language proficiency (Qian & Schedl, 2004). Another perspective, associated with scholars such as Vermeer (2001), argues that the two dimensions are fundamentally interconnected and may represent different manifestations of a single developmental process. Despite extensive research, the extent to which breadth and depth function as independent or interdependent dimensions remains a subject of ongoing debate.

The present study examines this issue through two instructional experiments involving Moroccan mid-professional tourist agents (MPTAs) learning English vocabulary related to Moroccan herbs. While instruction was delivered through the Comprehensive Instructional Language Learning Model (CILLM), the primary objective of the study is not to evaluate the effectiveness of the model itself. Rather, the study investigates how different instructional emphases may influence the relationship between vocabulary breadth and vocabulary depth in a specialized ESP context.

The focus on Moroccan herb vocabulary is particularly relevant because tourist agents frequently serve as cultural and informational mediators for international visitors. Effective communication in this domain requires not only knowledge of lexical items but also an understanding of their pronunciation, meaning, usage, and contextual appropriateness. Consequently, this specialized lexical field provides an appropriate context for examining the interaction between quantitative and qualitative dimensions of vocabulary knowledge. Although previous research has established the importance of both vocabulary breadth and vocabulary depth and has generally reported positive relationships between the two dimensions, important questions remain concerning the nature of that relationship. In particular, disagreement persists between multidimensional perspectives that regard breadth and depth as distinct but related dimensions and unidimensional perspectives that view them as manifestations of a single lexical construct (Vermeer, 2001). Furthermore, much of the existing research has focused on school or university learners in general language-learning contexts. Comparatively little attention has been devoted to professional learners operating within specialized ESP domains, and few studies have examined vocabulary development within highly specialized lexical fields such as Moroccan herbs. More importantly, limited research has investigated whether different instructional emphases may influence the relationship between vocabulary breadth and vocabulary depth. The present study addresses these gaps by examining the interaction between these dimensions among Moroccan mid-professional tourist agents learning English vocabulary related to Moroccan herbs under differing instructional conditions.

Specifically, the study seeks to answer the following research questions:

1. How does instructional emphasis on vocabulary breadth or vocabulary depth influence the relationship between these two dimensions of lexical knowledge?
2. To what extent do vocabulary breadth and vocabulary depth develop in tandem among professional learners of English for Specific Purposes?
3. What insights do the observed correlations provide regarding the dimensionality of vocabulary knowledge?

By addressing these questions, the study aims to contribute to the theoretical debate surrounding vocabulary dimensionality and to provide empirical evidence regarding the extent to which instructional focus may shape the relationship between lexical quantity and lexical quality.

More specifically, the study explores whether breadth-oriented and depth-oriented instructional approaches produce different patterns of association between these dimensions of vocabulary knowledge. In doing so, it seeks to contribute to a growing body of research examining how pedagogical factors may influence lexical development in ESP settings.

Hypotheses

Based on the existing literature regarding vocabulary dimensionality and the cognitive architecture provided by the **Dual-Route Cascaded (DRC) model**, the following hypotheses are proposed:

1. **Hypothesis 1 (Vocabulary Uptake Benchmark):** It is hypothesized that specialized ESP instruction for MPTAs will facilitate a vocabulary uptake rate that significantly exceeds established benchmarks of 3.8 to 5.4 words per hour reported in general language-learning contexts (Milton, 2009; Milton & Meara, 1998).
2. **Hypothesis 2 (Instructional Impact and Lexical Development):** It is hypothesized that breadth-oriented instruction will facilitate a high vocabulary uptake rate but produce a weaker relationship between vocabulary breadth and depth.

Within the interpretive framework of the DRC model, this pattern is expected to be consistent with rapid form–meaning mapping associated with the lexical (dictionary-lookup) procedure, resulting in uneven development across lexical dimensions and greater variability in qualitative word knowledge.

3. **Hypothesis 3 (Developmental Stability and Lexical Integration):** It is predicted that depth-oriented instruction focusing on phonology, orthography, and collocations will promote a stronger relationship between vocabulary breadth and depth. Within the interpretive framework of the DRC model, this pattern is expected to be consistent with greater lexical integration, networked processing, and coordinated activation across different aspects of lexical knowledge, resulting in a more stable pattern of depth–breadth development.

2. LITERATURE REVIEW

2.1 Vocabulary Knowledge as a Multidimensional Construct

Vocabulary knowledge has evolved from being viewed as a peripheral component of language proficiency to being recognized as one of its central dimensions. Earlier perspectives often treated vocabulary learning as an unsystematic process that received limited pedagogical and research attention (Meara, 1980). However, subsequent developments in vocabulary studies have established vocabulary knowledge as a critical predictor of language proficiency, reading comprehension, communicative competence, and academic achievement (Milton, 2009).

Defining what it means to know a word has proven to be a complex undertaking. Early attempts by Cronbach (1942) conceptualized word knowledge through a set of observable behaviors, including generalization, application, breadth, precision, and availability. Although pioneering, this framework focused primarily on meaning-related aspects and overlooked several dimensions that later became central to lexical research. Richards (1976) subsequently proposed a broader perspective, arguing that knowing a word entails knowledge of its frequency, contextual appropriateness, syntactic behavior, semantic value, associations, and derivational relationships.

Contemporary models increasingly portray vocabulary knowledge as a multidimensional construct. Henriksen (1999) proposed three dimensions of lexical competence: the continuum from partial to precise knowledge, depth of knowledge, and receptive–productive ability. Similarly, Daller et al. (2007) conceptualized vocabulary knowledge as a lexical space comprising breadth, depth, and fluency. Building on these developments, Qian (2002) proposed an influential framework consisting of four interconnected dimensions: vocabulary size, depth of vocabulary knowledge, lexical organization, and automaticity of receptive–productive knowledge.

Among these dimensions, vocabulary breadth and vocabulary depth have emerged as the most widely researched components of lexical competence and have become central to discussions concerning the nature of vocabulary knowledge and its development (Qian, 2002; Qian & Schedl, 2004).

2.2 Vocabulary Breadth

Vocabulary breadth, often referred to as vocabulary size, concerns the number of words a learner knows at least at a basic level (Qian & Schedl, 2004). It is generally regarded as the quantitative dimension of lexical knowledge and is commonly measured through vocabulary size tests that estimate the number of lexical items known by a learner.

The significance of vocabulary breadth has been consistently demonstrated in second-language acquisition research. Learners with larger vocabularies typically exhibit superior reading comprehension, listening comprehension, and overall language proficiency (Milton, 2009). Nation and Waring (1997) argued that vocabulary size is closely related to learners' ability to comprehend authentic texts, while Read (2000) emphasized that lexical coverage is a crucial determinant of successful reading comprehension.

Research has also highlighted the relationship between vocabulary size and language learning progress. Milton and Meara (1998) estimated that learners generally acquire approximately four words per instructional hour under ordinary classroom conditions, although rates vary considerably according to instructional context and learner characteristics. Consequently, vocabulary breadth has become a widely accepted indicator of lexical development and overall language proficiency.

Nevertheless, breadth measures provide only a partial representation of vocabulary knowledge because they focus primarily on the number of lexical items known rather than the quality of that knowledge (Qian, 2002). Although vocabulary breadth provides valuable information regarding the size of a learner's lexicon, it does not reveal the extent to which lexical items are integrated into broader semantic and functional networks.

2.3 Vocabulary Depth

In contrast to vocabulary breadth, vocabulary depth refers to how well words are known. It represents the qualitative dimension of lexical knowledge and encompasses multiple aspects of word mastery, including pronunciation, spelling, meaning, collocation, morphology, syntactic behavior, register, and frequency (Qian, 2002).

Researchers have consistently emphasized the complexity of depth knowledge. Haastrup and Henriksen (2000) argued that depth involves the establishment of lexical networks in which words are interconnected through semantic and associative relationships. Such relationships include paradigmatic associations such as synonymy, antonymy, and hyponymy, as well as syntagmatic relationships involving collocational patterns.

Similarly, Nation's (2022) comprehensive model of word knowledge illustrates the multifaceted nature of vocabulary depth. According to Nation, knowing a word requires knowledge of its form, meaning, and use. These dimensions include phonological and orthographic forms, form–meaning connections, conceptual knowledge, grammatical functions, collocations, and constraints on use. Consequently, depth knowledge extends far beyond simple word recognition and requires increasingly sophisticated lexical representations. From a cognitive perspective, depth knowledge may also reflect the degree of interconnectedness within the mental lexicon. Haastrup and Henriksen (2000) argued that depth develops through the process of network building, whereby learners establish semantic and associative links among lexical items, while Ouellette (2006) maintained that vocabulary breadth and depth reflect different aspects of lexical representation within the mental lexicon. Words that are linked through phonological, semantic, morphological, and collocational associations are likely to form richer lexical networks, facilitating retrieval and long-term retention. Laufer and Goldstein (2004) further emphasized that vocabulary knowledge involves considerably more than the mere association between word forms and meanings. According to these authors, lexical competence develops along a continuum of increasing mastery, ranging from basic recognition of a word to the ability to recall and use it appropriately. Their framework highlights the gradual nature of vocabulary development and suggests that lexical knowledge cannot be adequately captured through a single measure.

A particularly important contribution of Laufer and Goldstein (2004) concerns the distinction between receptive and productive vocabulary knowledge. While receptive knowledge generally refers to the ability to recognize and understand lexical items, productive knowledge involves the ability to retrieve and use them appropriately. The authors proposed a hierarchy consisting of passive recognition, active recognition, passive recall, and active recall, illustrating that vocabulary knowledge develops through progressively demanding levels of lexical control. This hierarchical view reinforces the argument that vocabulary depth is inherently multidimensional and extends beyond simple vocabulary size measures.

The complexity of depth knowledge has generated considerable challenges for vocabulary assessment. Milton (2009) noted that depth remains more difficult to define and measure than breadth because no single operational definition captures all its dimensions. Despite these challenges, depth is widely regarded as an essential component of communicative competence because it enables learners to use vocabulary accurately, appropriately, and fluently across contexts.

2.4 The Relationship Between Vocabulary Breadth and Vocabulary Depth

The distinction between receptive and productive knowledge further complicates the relationship between vocabulary breadth and vocabulary depth. Laufer and Goldstein (2004) argued that lexical knowledge exists at different levels of mastery, ranging from recognition to recall and from passive to active control. Consequently, two learners with similar vocabulary sizes may differ substantially in the quality and accessibility of their lexical knowledge. This observation supports the view that vocabulary breadth alone may not fully account for lexical competence and highlights the importance of examining how quantitative and qualitative dimensions of vocabulary interact.

The relationship between vocabulary breadth and vocabulary depth has become one of the most debated issues in vocabulary research. While most scholars agree that both dimensions are important, disagreement persists regarding whether they represent distinct constructs or different manifestations of a single underlying construct.

The multidimensional perspective conceptualizes vocabulary breadth and vocabulary depth as related but distinct dimensions of lexical knowledge. Breadth is typically associated with the number of lexical items known, whereas depth concerns the extent and quality of knowledge about those items (Qian, 2002). From this perspective, the two dimensions are expected to be correlated because they reflect aspects of the same lexical system; however, they are not assumed to be interchangeable, as each may make unique contributions to language proficiency and performance (Qian, 2002; Qian & Schedl, 2004). Support for the multidimensional perspective can be found in theories of the mental lexicon. Ouellette (2006) argued that vocabulary breadth reflects the quantity of lexical entries stored in memory, whereas vocabulary depth reflects the richness and complexity of semantic representations associated with those entries. From this perspective, breadth and depth involve different cognitive dimensions and may develop unevenly.

In contrast, the unidimensional perspective questions the existence of a clear boundary between breadth and depth. Vermeer (2001) argued that vocabulary growth is characterized by “developmental stability”, whereby increased exposure to words simultaneously contributes to both vocabulary expansion and deeper lexical understanding. Consequently, breadth and depth may represent different indicators of a single developmental process rather than independent dimensions.

Empirical studies have generally reported positive correlations between breadth and depth measures. Qian (1999), in one of the seminal studies in this area, found a strong relationship between the two dimensions of vocabulary knowledge. Similar findings were later reported by Mehrpour et al. (2011), who observed that learners with larger vocabularies also tended to demonstrate deeper lexical knowledge.

However, the strength of the relationship has varied considerably across studies, suggesting that the interaction between breadth and depth may be influenced by contextual, instructional, and learner-related factors. Such variability has prevented the emergence of a definitive consensus regarding the dimensionality of vocabulary knowledge and highlights the need for research examining the conditions under which breadth and depth develop more independently or more interdependently.

2.5 Instruction and the Development of Breadth and Depth

Although considerable research has investigated vocabulary breadth and depth separately, fewer studies have examined how instructional approaches influence the relationship between them. Vocabulary instruction frequently prioritizes lexical expansion through the introduction of large numbers of lexical items. Such approaches may promote rapid growth in vocabulary size but do not necessarily ensure sophisticated knowledge of the words learned.

Alternatively, depth-oriented instruction emphasizes multiple aspects of lexical knowledge, including pronunciation, spelling, semantic relationships, collocations, and contextualized usage. From a theoretical perspective, such instruction may strengthen lexical networks and foster stronger connections between vocabulary breadth and depth (Haastrup & Henriksen, 2000; Nation, 2022).

Despite the theoretical importance of this issue, relatively limited empirical evidence has examined how different instructional emphases influence the relationship between vocabulary breadth and vocabulary depth, particularly in English for Specific Purposes (ESP) contexts. Most previous studies have investigated the two dimensions as learner characteristics rather than as outcomes potentially shaped by pedagogical intervention. Consequently, little is known about whether breadth-oriented and depth-oriented instructional approaches produce different patterns of lexical development and different relationships between vocabulary size and vocabulary quality.

Beyond pedagogical frameworks, the cognitive architecture of vocabulary development can be understood through the Dual-Route Cascaded (DRC) model (Coltheart et al., 2001). This model differentiates between a 'lexical (dictionary-lookup)' procedure, which facilitates rapid form-meaning mapping through local representations within an orthographic lexicon, and a 'nonlexical (rule-based)' procedure involved in more complex linguistic processing. Within this framework of cascaded processing, the lexical route allows for near-instantaneous word recognition once a lexical unit reaches a 'critical level of activation' (Rastle & Coltheart, 1999). This process is often facilitated by a 'fast-guess' mechanism (Rastle & Coltheart, 1999), which allows for a recognition decision to be made based on the summed activation of the lexicon, potentially before full linguistic or semantic processing is finalized. By applying this framework, the present study examines whether different instructional emphases act as a catalyst for these distinct pathways—either the fast-acting but potentially fragile mappings of the lexical route (associated with vocabulary breadth) or the complex networked processing required for developmental stability and depth.

3. Methodology

This study employed a mixed-methods design to investigate the relationship between vocabulary breadth and vocabulary depth among Moroccan mid-professional tourist agents (MPTAs) learning English vocabulary related to Moroccan herbs. The study combined quantitative measures of vocabulary development with qualitative observations of instructional practices. While instruction was delivered through the Comprehensive Instructional Language Learning Model (CILLM), the primary objective of the study was to examine how different instructional emphases influenced the relationship between vocabulary breadth and vocabulary depth.

3.1 Research Design and Approach

The study utilizes both qualitative and quantitative data to achieve a comprehensive understanding of the instructional impact on vocabulary acquisition. The qualitative component involves a detailed description and evaluation of the learning process based on three dimensions of the CILLM framework: internal comprehensiveness (input, competency building, and engagement), fitness of practices within the learning chain, and discursive success (quality, quantity, manner, and relevance). Quantitatively, the research measures participants' performance through placement tests, pre-tests, and post-tests to track variables in vocabulary breadth and depth.

3.2 Participants and Research Settings

The study involved two experimental groups of Moroccan mid-professional tourist agents (MPTAs) drawn from different instructional settings.

- **Experimental Group 1 (Marrakech).** The first group consisted of 10 MPTAs (4 females and 6 males) enrolled at the WLC Institute in Marrakech. Participants represented various professional roles within the tourism sector, including receptionists, pastry chefs, and drivers. Their English proficiency levels ranged from A1 to B1 according to the Common European Framework of Reference for Languages (CEFR). Instruction in this group emphasized vocabulary breadth and focused primarily on expanding participants' lexical repertoire related to Moroccan herbs.
- **Experimental Group 2 (Agadir).** The second group consisted of 18 MPTAs (10 females and 8 males) enrolled at Polymath School in Agadir. Participants ranged in age from 25 to 37 years and included herbalists, tour guides, and beauty advisors. Their English proficiency levels also ranged from A1 to B1. Instruction in this group emphasized vocabulary depth and focused on phonological, orthographic, semantic, and collocational aspects of the target vocabulary (Moroccan herbs).

3.3 Research Instruments

Several instruments were employed to assess participants' vocabulary knowledge and language proficiency.

- **Placement Test:** A 50-item multiple-choice placement test based on the McMillan framework was administered through Google Forms to determine participants' initial English proficiency levels.
- **Vocabulary Breadth Test:** A 22-item assessment measured participants' recognition and knowledge of English vocabulary related to Moroccan herbs.
- **Vocabulary Depth Test:** A 30-item assessment measured participants' knowledge of pronunciation, spelling, meaning, and usage of target lexical items.
- **Kahoot! Platform:** Pre-tests and post-tests were administered through Kahoot! to increase participant engagement and facilitate the integration of visual and audio stimuli associated with Moroccan herbs.

Both breadth and depth assessments were administered before and after instruction to measure vocabulary development and to examine the relationship between the two dimensions of lexical knowledge.

3.4 Data Collection Procedures

Instructional content was developed on the basis of preliminary consultations with herbalists in Marrakech and Agadir concerning commonly used Moroccan herbs and their applications. Participants completed pre-tests prior to instruction and post-tests following the completion of the instructional programme.

The Marrakech group received breadth-oriented instruction emphasizing the acquisition of a larger number of lexical items. In contrast, the Agadir group received depth-oriented instruction emphasizing pronunciation, spelling, semantic relationships, and collocational usage. Classroom sessions were video-recorded to document instructional practices and learner engagement. The internal validity of the study was supported by these recordings, which ensured instructional fidelity. Furthermore, content validity was supported through preliminary consultations with professional herbalists in Marrakech and Agadir, who assisted in identifying commonly used Moroccan herbs and their associated terminology. This process helped ensure that the assessment items reflected the lexical demands of the participants' professional domain. Additional face validity was enhanced through the integration of visual representations depicting the target vocabulary, including nouns, action verbs, and adjectives associated with Moroccan herbs. Both the breadth and depth assessments were administered through the Kahoot! platform using a multiple-choice format with four response options and a standardized response time of 20 seconds per item. To minimize potential technological bias, participants were first familiarized with the platform and received guided practice on its use before completing the actual assessments. Following test completion, the Kahoot! platform generated automated reports detailing participants' scores, correct responses, and incorrect responses, thereby enhancing transparency and ensuring consistency in test administration.

3.5 Data Analysis

Descriptive statistics, including means, standard deviations, and score ranges, were calculated to summarize participant performance across the breadth and depth assessments.

To examine the relationship between vocabulary breadth and vocabulary depth, Pearson Product–Moment Correlation coefficients were calculated for each experimental group. Correlation analyses were conducted using post-test scores to determine the degree of association between quantitative and qualitative dimensions of lexical knowledge.

Because some participants were unable to complete the final assessments due to professional commitments, analyses were conducted using the available post-test data. Mean scores and standard deviations were calculated to provide a transparent description of participant performance despite attrition. To ensure the statistical reliability of the findings despite the small sample sizes, Fisher's z-transformation was employed to test the significance of the difference between the correlations observed in the two instructional contexts. Furthermore, 95% confidence intervals were calculated for each correlation coefficient to assess the stability of the observed relationships.

3.6 Ethical Considerations

Participation was voluntary, and informed consent was obtained from all participants prior to data collection. Participants were informed of the purpose of the study. To accommodate professional obligations, flexibility was provided regarding attendance and scheduling whenever necessary.

4 Results

4.1. Experiment 1: Marrakech (Breadth-Oriented Instruction)

In the first experiment (N=10), instruction prioritized the quantity of lexical items (breadth). While learners demonstrated significant gains in recognition, their depth of knowledge remained highly inconsistent. Descriptive statistics for the breadth and depth assessments are presented in Table 1.

Table 1

Descriptive Statistics for Experiment 1 (Marrakech).

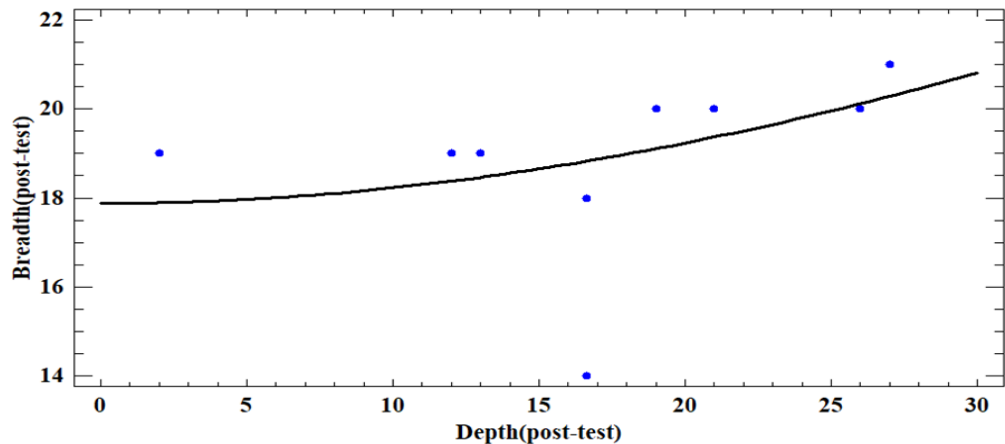
Test Variable	N	M (%)	SD	Range (%)
Breadth Pre-test	10	60.00	15.42	36.36–81.82
Breadth Post-test	10	85.91	8.69	63.64–95.45
Depth Post-test	8*	55.42	27.66	6.76–90.00

Note. N = number of participants; M = mean; SD = standard deviation. The sample size for the depth post-test decreased from 10 to 8 participants because of professional absences during the final depth assessment.

- **Breadth Gains and Uptake:** Participants demonstrated substantial improvement in vocabulary breadth. The mean breadth score increased from 60.00% in the pre-test to 85.91% in the post-test. Participants acquired approximately 95 target lexical items over 11 hours of instruction, corresponding to an estimated vocabulary uptake rate of 6.67 words per contact hour. This rate significantly exceeds the standard classroom average of four words per hour.
- **Depth Performance** The mean depth post-test score was 55.42%, with a relatively large standard deviation (SD = 27.66). Scores ranged from 6.76% to 90.00%, indicating considerable variability in participants' depth of lexical knowledge following instruction.
- **Correlation:** Statistical analysis revealed a weak relationship ($r = 0.29$) between breadth and depth post-test scores. The high SD in the depth post-test (27.66) underscores that gains in vocabulary breadth were not uniformly accompanied by corresponding improvements in the qualitative dimensions of word knowledge.

The relationship between vocabulary breadth and depth post-test scores was analyzed to determine the degree of linear association in the breadth-oriented group. As reported in Table 1, while participants achieved significant gains in lexical size, the correlation with qualitative depth was found to be weak ($r = 0.29$)

Figure 1: Scatter plot illustrating the weak relationship and high variance in the breadth-oriented group (Marrakech). The dispersed distribution reflects the qualitative inconsistency of the 'direct lexical route.'



The visual distribution in Figure 1 illustrates this statistical instability, where high breadth scores do not consistently correspond to high depth scores. These findings suggest that breadth-oriented instruction may be associated with more variable patterns of lexical development, whereby substantial gains in vocabulary size are not uniformly accompanied by equivalent development in qualitative aspects of word knowledge.

4.2. Experiment 2: Agadir (Depth-Oriented Instruction)

The second experiment involved 18 Moroccan mid-professional tourist agents (MPTAs) and emphasized vocabulary depth, including phonological, orthographic, semantic, and collocational aspects of lexical knowledge. Descriptive statistics are presented in Table 2.

Table 2

Descriptive Statistics for Experiment 2 (Agadir)

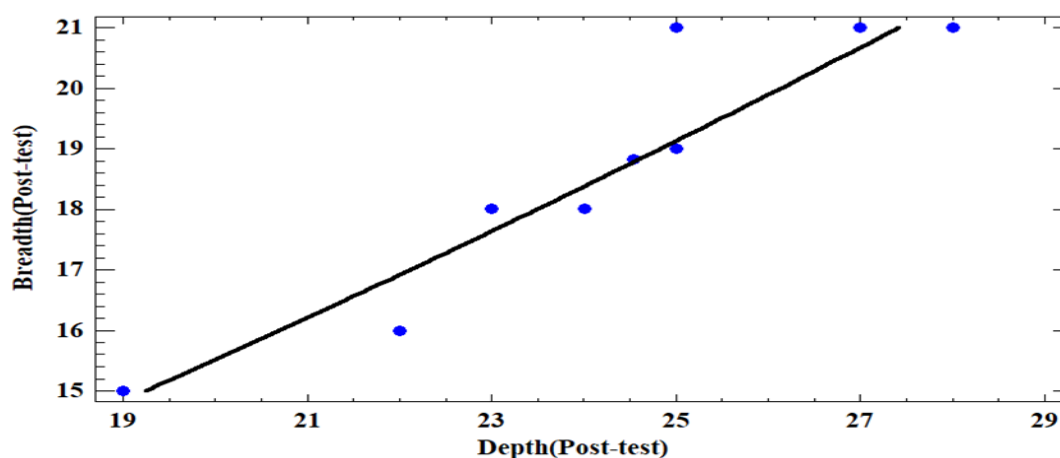
Test Variable	N	M (%)	SD	Range (%)
Breadth Pre-test	18	49.24	14.14	22.73–72.73
Breadth Post-test	12*	83.81	11.07	63.64–95.45
Depth Pre-test	18	52.41	16.76	16.76–76.76
Depth Post-test	12*	79.72	11.14	56.67–93.33

Note. Six participants were unavailable for the final post-tests because of professional obligations.

- Breadth Gains:** Despite the instructional emphasis on depth, participants demonstrated substantial improvement in vocabulary breadth. Mean breadth scores increased from 49.24% in the pre-test to 83.81% in the post-test. Post-test scores ranged from 63.64% to 95.45%, and several participants achieved scores exceeding 90%.
- Depth Gains:** Participants demonstrated substantial progress in their quality of knowledge. Depth pre-test scores ranged from 16.67% to 76.67%. Following instruction, post-test depth scores improved to a range of 56.67% to 93.33%.
- Correlation:** Pearson correlation analysis revealed a very strong positive relationship between breadth and depth post-test scores ($r = .94$). In addition, the standard deviations for breadth ($SD = 11.07$) and depth ($SD = 11.14$) were relatively similar, indicating comparable levels of variability across the two measures.

In contrast, the depth-oriented experiment revealed a markedly different pattern of association between the two dimensions. Following the instructional focus on phonology and collocations, the correlation between breadth and depth was found to be near-perfect ($r=0.94$)

Figure 2: Scatter plot illustrating the near-perfect linear relationship in the depth-oriented group (Agadir). The tight clustering suggests a high degree of alignment between vocabulary breadth and depth and is consistent with the notion of developmental stability..



As shown in Figure 2, the tight clustering of data points along the regression line validates the state of "developmental stability" predicted by Vermeer (2001). This indicates that when instruction targets deep mastery, vocabulary dimensions move in tandem as a unified construct.

4.3 Summary of Findings

The two experiments produced markedly different correlation patterns. The breadth-oriented condition yielded a weak positive correlation between vocabulary breadth and vocabulary depth ($r = .29$), whereas the depth-oriented condition yielded a very strong positive correlation ($r = .94$). Both instructional approaches were associated with substantial gains in vocabulary performance; however, the observed relationship between breadth and depth differed considerably across the two instructional contexts. A Fisher's z -test confirmed that the difference between the weak correlation in Marrakech ($r = 0.29$) and the very strong correlation in Agadir ($r = 0.94$) was statistically significant ($z = -2.58$, $p = 0.0099$). While the Marrakech group exhibited a wide 95% confidence interval (CI $[-0.52, 0.83]$), indicating substantial uncertainty regarding the magnitude of the breadth–depth relationship, the Agadir group exhibited a considerably narrower interval (CI $[0.79, 0.98]$), suggesting a more precise estimate of the association between the two dimensions.

5. DISCUSSION

The primary objective of this study was to examine the relationship between vocabulary breadth and vocabulary depth among Moroccan mid-professional tourist agents (MPTAs). The results provide comprehensive support for the study's hypotheses, demonstrating that the relationship between lexical dimensions is not a fixed ontological trait (an inherent nature of vocabulary) but a methodological outcome shaped by instructional focus.

1. Evidence for Hypothesis 1: Professional Schema and Uptake Rates.

The findings provide preliminary support for Hypothesis 1, which predicted that specialized ESP instruction for MPTAs would significantly exceed established vocabulary uptake benchmarks. Participants in Marrakech achieved a striking uptake rate of 6.67 words per contact hour. This figure nearly doubles the standard classroom average of 3.8 to 5.4 words per hour reported by Milton (2009) and Milton and Meara (1998). This acceleration suggests that when content is directly aligned with professional needs, mid-professional learners likely leverage existing professional schema related to Moroccan herbs to build their repertoire more rapidly than through standard classroom rote memorization.

2. Evidence for Hypothesis 2: Breadth-Oriented Inconsistency and the Lexical Route.

The Marrakech results provide support for Hypothesis 2 regarding the impact of breadth-oriented instruction on the relationship between vocabulary breadth and depth. Despite high uptake, the relationship between dimensions was weak ($r=0.29$) and marked by significant statistical instability, evidenced by the high variance in depth scores ($SD=27.66$). The DRC model is employed in the present study as an interpretive framework rather than as a cognitive model directly tested by the data. Consequently, the observed correlations should not be viewed as direct evidence of route activation but as statistical patterns that may be consistent with the processing distinctions proposed by the model.

The visual evidence in Figure 1 may be interpreted through the 'direct lexical route' of the DRC model; The absence of a clear linear trend suggests that these rapid gains were not consistently accompanied by corresponding development in qualitative lexical knowledge. This statistical pattern is broadly consistent with certain predictions of the Dual-Route Cascaded (DRC) model (Coltheart et al., 2001). The gains likely relied on the 'direct lexical route'—a fast-acting procedure that utilizes local

representations within an orthographic lexicon to map form to meaning. This procedure is often facilitated by a 'fast-guess' mechanism, which allows for a recognition decision (breadth) to be made as soon as a lexical entry reaches a 'critical level of activation' (Rastle & Coltheart, 1999). Because instruction prioritized quantity, learners established form-recognition activation, but these mappings remained fragile tokens independent of the deeper linguistic integration required for depth mastery, making them sensitive to lateral inhibition from neighbors. This pattern validates the multidimensional view (Qian, 2002), where size and quality develop unevenly.

3. Evidence for Hypothesis 3: Depth-Oriented Instruction and Developmental Stability.

The Agadir experiment provides evidence for Hypothesis 3, revealing a very strong correlation ($r = 0.94$) and comparable standard deviations ($SD \approx 11$) across both dimensions. As shown in Figure 2, the close clustering of data points around the regression line suggests a high degree of alignment between vocabulary breadth and depth. This pattern is consistent with what Vermeer (2001) describes as developmental stability, whereby growth across lexical dimensions occurs in a more coordinated manner.

Within the interpretive framework of the DRC model, this pattern may be consistent with more integrated and networked forms of lexical processing. By systematically focusing on phonology, orthography, and collocations, instruction may have promoted stronger activation and interaction among different aspects of lexical knowledge. This interpretation is also compatible with the Lexical Subsystem Framework (Elkhatmi & Baaqili, 2025), which conceptualizes specialized vocabulary as an integrated subsystem rather than a collection of isolated units. By emphasizing these multidimensional links during instruction, the framework provides the pedagogical blueprint for understanding how depth-oriented instruction may facilitate stronger lexical integration. Although these activation processes were not directly measured, the strong breadth–depth relationship observed in the Agadir group is compatible with the notion that depth-oriented instruction facilitates greater lexical integration. In this sense, growth in one dimension may support activation in related dimensions, allowing vocabulary size and vocabulary quality to develop in tandem.

4. Statistical Rigor and the Dimensionality Debate.

The discrepancy in correlations ($r = 0.29$ vs. $r = 0.94$) offers important insights into the debate between multidimensional (Qian, 2002) and unidimensional (Vermeer, 2001) perspectives on vocabulary knowledge. A Fisher's z -transformation confirmed that the difference between the two correlations was statistically significant ($z = -2.58$, $p = 0.0099$). Furthermore, the 95% confidence intervals provide additional context for interpreting these relationships. While the Marrakech group exhibited a wide confidence interval (CI $[-0.52, 0.83]$), indicating substantial uncertainty regarding the magnitude of the breadth–depth relationship, the Agadir group demonstrated a considerably narrower interval (CI $[0.79, 0.98]$), suggesting a more stable estimate of the association between the two dimensions. Although the wide interval observed in Marrakech warrants caution in interpreting the precise strength of the relationship, the contrast between the two instructional conditions suggests that the observed breadth–depth relationship may be sensitive to instructional emphasis. Consequently, the findings may provide support for both theoretical perspectives under different instructional conditions rather than unequivocally validating a single view.

6. Implications:

The findings offer several pedagogical implications for English for Specific Purposes (ESP), particularly in contexts where Moroccan tourist agents are required to communicate with professional accuracy and credibility.

- **Quality as a Catalyst:** The findings suggest that instruction emphasizing the depth of vocabulary knowledge may facilitate a closer alignment between vocabulary breadth and depth. While breadth-oriented instruction can support rapid vocabulary expansion, the observed weak correlation indicates that increases in vocabulary size may not always be accompanied by corresponding growth in qualitative lexical knowledge. Emphasizing lexical quality may therefore contribute to more integrated vocabulary development.

- **Network Building:** ESP instruction may benefit from moving beyond the accumulation of isolated lexical items toward the development of interconnected lexical networks. Greater attention to pronunciation, spelling, collocations, and contextualized usage may help learners establish stronger links among different aspects of lexical knowledge, particularly in specialized professional domains. Such an approach is compatible with the Lexical Subsystem Framework (El khatmi & Baaqili, 2025), which emphasizes the importance of developing interconnected lexical networks encompassing meaning, grammatical behavior, collocations, and semantic associations rather than treating vocabulary as a collection of isolated lexical items.

- **Comprehensive Assessment:** Assessments focusing exclusively on vocabulary size may provide only a partial representation of lexical competence. Incorporating measures of both vocabulary breadth and depth may offer a more comprehensive evaluation of learners' ability to use specialized vocabulary accurately and appropriately in professional contexts.

7. Limitations and Future Research.

Several limitations must be acknowledged when interpreting the findings of this exploratory study.

Sample Size and Attrition: The primary constraint concerns the small and fluctuating sample size (in Marrakech and in Agadir). The study was further impacted by participant attrition during the post-test phase, which reduced the cohorts to 8 and 12 participants respectively. This attrition was largely due to unforeseen professional and family emergencies common among mid-professional cohorts. Consequently, the statistical power of the correlations is limited, and the findings should be viewed as exploratory rather than conclusive.

Psychometric Validation and Reliability: A second significant limitation concerns the research instruments. While the 22-item breadth and 30-item depth assessments were carefully designed through consultations with professional herbalists to ensure high content validity, they were not subjected to formal pilot testing or extensive psychometric validation. Critically, the study currently lacks formal internal consistency reliability coefficients (such as Cronbach's alpha or KR-20) for these specialized ESP measures. While the assessments were administered under standardized conditions using the Kahoot! platform to ensure internal validity, the absence of these coefficients means the stability of the qualitative measures has not been fully established.

Quasi-Experimental Design The study employed a quasi-experimental design involving different participant groups in different instructional settings. Because of this design, the results establish an association between instructional focus and lexical development rather than a definitive causal relationship.

Directions for Future Research To build upon these exploratory results, future research should:

1. **Prioritize Psychometric Robustness:** Future studies must conduct formal pilot testing and calculate reliability coefficients to ensure the instruments are stable for professional ESP contexts.
2. **Employ Longitudinal Designs:** Larger, longitudinal studies are necessary to confirm whether the observed "developmental stability" in depth-oriented instruction remains sensitive to instructional focus over longer durations.
3. **Advanced Statistical Analysis:** Utilizing larger samples and random assignment would allow for more advanced statistical techniques to further investigate the interaction between vocabulary size and quality among professional learners.

8. Conclusion

This study investigated the relationship between vocabulary breadth and depth among Moroccan mid-professional tourist agents (MPTAs). The findings suggest that the relationship between lexical size and lexical quality may be sensitive to instructional emphasis rather than representing a fixed characteristic of vocabulary knowledge. The breadth-oriented condition was associated with rapid vocabulary expansion and a relatively weak breadth–depth relationship, whereas the depth-oriented condition was associated with a substantially stronger relationship between the two dimensions. Interpreted through the theoretical lens of the Dual-Route Cascaded (DRC) model, these patterns may be consistent with different forms of lexical processing and degrees of lexical integration, although the underlying cognitive mechanisms were not directly examined in the present study. Overall, the findings suggest that emphasizing qualitative aspects of vocabulary knowledge may contribute to a more closely aligned development of vocabulary breadth and depth, ultimately supporting stable linguistic competence required for professional credibility in the workplace. Given the relatively small sample sizes and participant attrition, these conclusions should be regarded as exploratory and warrant further investigation through larger-scale and longitudinal research.

Statements and Declarations

(a) Funding: This research received no external funding.

(b) Conflicts of Interest: The authors declare no conflict of interest.

(c) Acknowledgments: The authors would like to express their sincere gratitude to the professional herbalists in Marrakech and Agadir whose expertise and preliminary consultations were essential in identifying and selecting the target lexical items for this study. We also wish to acknowledge the administration and staff of the WLC Institute in Marrakech and the Polymath School in Agadir for their cooperation in facilitating the instructional experiments and supporting the data collection process. Finally, we thank the mid-professional tourist agents who participated in this research for their time and commitment to enhancing ESP pedagogical practices.

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