

Exploring differences in vocabulary knowledge of semi-urban ESL undergraduate students

Explorando as diferenças de conhecimento de vocabulário de inglês como segunda língua em alunos de graduação de uma região semiurbana

Doddapaneni Anil Kumar¹

anilkumar.srit@gmail.com

Indian Institute of Technology Madras

Senkamalam Periyasamy Dhanavel¹

dhanavelsp@gmail.com

Indian Institute of Technology Madras

ABSTRACT - This study explored the differences in receptive and productive vocabulary knowledge in terms of word frequency level and vocabulary size in undergraduate learners of English as a Second Language (ESL). A total of 90 first-year undergraduate engineering students from a semi-urban region in India participated in the study. Two quantitative vocabulary tests, the Receptive Vocabulary Levels Test (Schmitt *et al.*, 2001) and the Productive Vocabulary Levels Test (Laufer and Nation, 1999), were applied sequentially to the students. The first test focused on identifying receptive vocabulary size, while the second test measured productive vocabulary size. Data were analyzed using SPSS software. Results indicate that the students' receptive word knowledge is higher than their productive word knowledge. Similarly, the students' receptive vocabulary size is larger than their productive vocabulary size. Furthermore, the difference between their receptive and productive vocabulary size is 27.69%. In order to bridge this gap and increase their vocabulary knowledge and size, we recommend an activity-based, explicit vocabulary teaching approach through self-learning, group learning and mutual learning in the regular classrooms.

Keywords: vocabulary knowledge, word frequency levels, receptive and productive vocabulary size, undergraduate students.

RESUMO - Este estudo explorou as diferenças entre conhecimento de vocabulário receptivo e produtivo com referência ao nível de frequência das palavras e à quantidade de vocabulário de estudantes de graduação de inglês como segunda língua. Um total de 90 estudantes de graduação de primeiro ano de engenharia de uma região semi-urbana na Índia participaram do estudo. Dois testes quantitativos de vocabulário, Teste de níveis de vocabulário receptivo (Schmitt *et al.*, 2001) e Teste de níveis de vocabulário produtivo (Laufer e Nation, 1999), foram realizados com eles, um após o outro, durante 50 minutos cada. O primeiro teste centrou-se na identificação da quantidade de vocabulário receptivo, enquanto que o segundo focou na quantidade de vocabulário produtivo. Os dados coletados desses dois estudos quantitativos foram analisados com a ajuda do *software* SPSS. Os resultados indicam que o conhecimento de vocabulário receptivo dos alunos é superior ao conhecimento de vocabulário produtivo. Do mesmo modo, de vocabulário receptivo dos alunos é maior que a quantidade de vocabulário produtivo. Além disso, a diferença entre vocabulário receptivo e o produtivo é de 27,69%. Para colmatar essa lacuna e aumentar o conhecimento e o tamanho do vocabulário, este estudo recomenda o ensino de vocabulário explícito baseado em atividades por meio da autoaprendizagem, do aprendizado grupal e da aprendizagem mútua nas salas de aula regulares.

Palavras-chave: conhecimento do vocabulário, níveis de frequência de palavras, quantidade de vocabulário receptivo e produtivo, estudantes de graduação.

Introduction

Generally, successfully learning a language involves, to a large extent, learning its vocabulary. It is not surprising that researchers in this field keep on emphasizing the im-

portance of vocabulary learning. According to Zimmerman (1997), vocabulary is fundamental to language learning and essential to the language learner. Similarly, Wilkins (1972) emphasizes that learners can communicate in a language without any knowledge of grammar, but they cannot convey

¹ Indian Institute of Technology Madras. Department of Humanities and Social Sciences. 600036, Chennai, India.

messages without a solid knowledge of vocabulary. Further, Nation (2011) attributes primary importance to vocabulary when learning the four language skills in English. As a result, several vocabulary teaching and learning methods have been suggested in order to enhance the vocabulary of second-language learners. Some notable methods are incidental and intentional vocabulary learning, lexical approaches, mnemonic techniques, the keyword method and word lists. In the context of learning English as a second language in India, Dhanavel (2012) suggested the “five S” approach to vocabulary building. “Five S” stands for “sight, sound, source, sense and syntax”. He believes that his “approach offers a practical method for acquiring as large a vocabulary of English for communication as possible” (Dhanavel, 2012, p. 42). Further, Vasu and Dhanavel (2015) examined the attitude of learners towards vocabulary-building and the choice of sources for vocabulary learning. They stressed the need for raising students’ awareness on the importance of learning adequate vocabulary. In a study carried out in a Chinese setting, Zhang and Lu (2015) showed that strategies focused on learning the forms and associative meanings of words were significant predictors of students’ vocabulary knowledge. Evidently, students have to know enough words in a language to communicate effectively.

Statement of the problem

In India, the number of students pursuing an education in engineering increases every year. Out of all students who choose the engineering programme in Andhra Pradesh, 11.06% come from semi-urban regions (www.aicte.org). They are academically bright and intelligent, but are often faced with the challenge of communicating in English, which is the medium of instruction in professional education. Besides, after graduating with an engineering degree, they are expected to use English competently in their work setting as well. As students, their duties include listening to lectures, reading textbooks and reference books, taking notes in class, writing reports, making presentations on various subjects, and speaking with their teachers and peers in English. However, their inadequate linguistic knowledge prevents them from performing well in their studies, which limits their opportunities for professional growth. Their primary problem is limited vocabulary, which is a considerable hindrance to their communication. Based on these observations, we sought to explore the differences between receptive and productive vocabulary knowledge in terms of word frequency levels and vocabulary size of first-year undergraduate engineering students from a semi-urban region in India.

Vocabulary knowledge

Vocabulary knowledge is crucial for second-language learners as a limited vocabulary constraints

the communicative activity and hinders the general communication process. According to Schmitt (2000), vocabulary knowledge is the most fundamental aspect of second-language acquisition and is the key to communicative competence. Nation (2001) observes that vocabulary knowledge and language use are interrelated, as vocabulary knowledge enables language use and language use enhances the learners’ vocabulary. Moreover, Schmitt (2008) strongly advocates that vocabulary knowledge is an essential element in second-language learning, because words carry the main meaning and transmit the primary information. Therefore, it is imperative for students to achieve sufficient vocabulary knowledge by engaging in constant vocabulary development activities. However, this process is only possible when students realize the necessity of understanding the various dimensions of vocabulary knowledge.

Literature review

Vocabulary knowledge is widely recognized as a vital aspect of second-language (L2) vocabulary acquisition and proficiency. In fact, it is considered a multi-dimensional construct, and not a unidimensional concept (Read, 1993; Kezhen, 2015). Research on the quantity and quality of lexical words needed for effective communication in a second-language has given rise to a number of studies in which breadth (size) and depth have been identified as two different dimensions of vocabulary knowledge (Wesche and Paribakht, 1996; Qian, 1999; Milton, 2009). Vocabulary breadth and depth describe the number of lexical words one knows and how well one knows the related words, respectively (Qian, 2002; Nergis, 2013). Furthermore, vocabulary size is the basic dimension of a learners’ lexical competence, and learners with a larger vocabulary size use language more proficiently than the learners with a smaller vocabulary size (Meara, 1996). Of course, knowing a word does not refer to knowing its meaning in a single specific context, it also refers to a wide knowledge related to its pronunciation and, syntactic and semantic relationships with other words, such as collocations, synonyms, antonyms, and hyponyms. In short, vocabulary knowledge is considered a multi-dimensional rather than unidimensional aspect of language learning (Read, 1993).

Out of several parameters, the distinction between receptive and productive vocabulary is the best-known dimension of “knowing a word” (Laufer and Nation, 1999). Indeed, most researchers, such as Henriksen (1999), have accepted the division between the receptive and productive dimensions. Although “receptive” and “productive” are the commonly used terms in vocabulary-related research, no clear definitions have been provided in the literature. In spite of this, Nation (2001) attempted a clear distinction between receptive and productive vocabulary. According

to him, receptive vocabulary refers to listening and understanding a word when someone says it, while productive vocabulary refers to recalling and using the word either in spoken or written form.

Research on vocabulary learning has focused on the number of words that second-language learners are likely to encounter due to a close relationship between academic success and vocabulary knowledge (Corson, 1997; Laufer, 1997; Nation, 2001). Nation (2006) and Staehr (2009) believe that a learner needs between 2,000 and 3,000 words to converse in English. Similarly, Laufer and Ravenhorst-Kalovski (2010) suggest that 4,000 and 5,000 words are required to understand 95 percent of the text and add that 8,000 and 9,000 words are needed to understand 98 percent of the text. Nation (2006) states that learners of a second or foreign language who wish to read and comprehend unsimplified authentic texts should have a vocabulary between 8,000 and 9,000 words.

Since mastering vocabulary is considered a key element to learning a foreign language, many researchers have tried to measure the learner's receptive and productive vocabulary sizes. Waring (1997) examined the nature of the receptive and productive vocabulary frequency profiles of female Japanese second-language learners. The results revealed that the subjects' receptive vocabulary was larger than productive vocabulary at each frequency band. They also indicated that it was easier to access receptive words than productive words. Laufer (1998) assessed the gains in three types of English as a Foreign Language (EFL) vocabulary knowledge during one year of school instruction. The results showed that passive vocabulary size progressed very well, that controlled active vocabulary also progressed to an extent, but that the free active vocabulary did not progress at all. The study concluded that the subjects' passive vocabulary increased by 1,600 words in one year of school instruction and suggested that classroom instruction may be the most favourable setting for vocabulary learning.

Laufer and Paribakht (1998) investigated the three types of vocabulary knowledge – (passive, controlled active and free active) – within the same individuals. Adult learners of English from Israel and Canada with different proficiency levels took part in the study. The results showed that the three dimensions of vocabulary developed at different rates. The passive vocabulary of both the ESL and EFL groups was larger than the controlled active vocabulary. However, the controlled active and passive vocabulary ratio was higher in the EFL group. The study concluded that, overall, the passive vocabulary was significantly larger than the controlled active and free active vocabularies. Besides, the passive-active vocabulary gap was narrower with the EFL learners than with ESL learners.

In Indonesia, Nurweni and Read (1999) conducted a vocabulary-size study of 324 first-year university students

using a Vocabulary Levels Test. They identified a mean vocabulary size of 1226 words and 240 general academic words. Their assessment fell far short of the 4,000-word goal prescribed by the 1984 national curriculum for senior high schools in Indonesia. Webb (2008) also investigated the receptive and productive vocabulary sizes of 83 native Japanese speakers enrolled in a second-year EFL course at a university in Japan. The researcher designed the receptive and productive translation tests to measure the participants' vocabulary size at three-word frequency levels. In the receptive test, students were required to answer the L2 target word in L1 form, while in the productive test they had to use L1 meanings to write their answers in L2 form. Results showed that the difference between both receptive and productive vocabulary sizes increased as frequency decreased. The findings supports the assumption that receptive knowledge precedes productive knowledge. Furthermore, the study concluded that vocabulary instruction and the proficiency level of students were likely to have a significant effect on vocabulary size.

Zheng (2009) analyzed the receptive-productive relationship across different word frequency levels in Chinese EFL learners. The results showed that the receptive and productive vocabulary gap gradually narrowed down as the students' receptive vocabulary size increased. The findings also suggested that receptive and productive vocabularies might vary across different learning contexts and that they might be affected by the quantity and quality of the input and the specific approach to vocabulary teaching. In another research with Chinese students of non-English major degrees in Science and Arts, Zhou (2010) compared the receptive and productive academic vocabulary knowledge. The findings revealed that students had a broader receptive vocabulary than a productive one, and further indicated that the receptive academic vocabulary grew at a higher rate than the productive academic vocabulary.

In India, Rajasekharan and Selvakumar (2012) investigated the vocabulary of second year engineering students. This study examined their vocabulary from the perspective of sociological factors like gender, medium of study, place of residence, and reading habits. The findings showed that the students' vocabulary differed based on gender and living area. It also found that English-medium students knew more words than the regional-medium students, and that the reading habits of students had a greater impact on their vocabulary. Ibrahim *et al.* (2013) measured the vocabulary size of Malaysian pre-university students. Although the results showed a statistically significant relationship between students' receptive and productive vocabulary scores, the pre-university students' vocabulary was far below the recommended threshold needed to acquire vocabulary independently.

In a recent study, Hajiyeva (2014) examined vocabulary frequency levels and the vocabulary size of first-year English students in Azerbaijan. The results revealed that

over half of the students scored low in both receptive and productive vocabulary tests. In fact, the average receptive vocabulary was 2,091 words, while the productive one comprised fewer than 1,000 words. In another study, Hajiyeva (2015) analyzed the relationship between receptive and productive vocabulary sizes and their use in an EFL context with a similar group. The results showed that the overall receptive vocabulary knowledge was broader than the productive knowledge and that the gap between them reduced after one year of instruction. However, the study concluded that even one-year of vocabulary instruction could not help them achieve the lexical threshold needed for academic purposes.

In short, most studies on vocabulary size agree that the receptive vocabulary knowledge of both ESL and EFL learners precedes their productive vocabulary. These studies have been carried out across many regions of the world, but few have explored the vocabulary knowledge of undergraduate engineering students from a semi-urban region in India. Hence, this study sought to investigate the differences in vocabulary knowledge of first-year undergraduate engineering students from a semi-urban Indian region and to suggest ways of helping them acquire enough vocabulary to complete their courses and have an adequate job performance.

Study design

Objective

The present study aimed to explore the differences in word frequency levels of first-year undergraduate engineering students in a semi-urban region in India and to identify the differences in their receptive and productive vocabulary sizes.

Research questions

To achieve the objective, this study addressed the following questions:

- (i) What are the differences in word frequency levels of semi-urban first-year undergraduate engineering students?
- (ii) What are the differences in their receptive and productive vocabulary sizes?

Participants

A total of 90 undergraduates, 32 males and 58 females between 17 and 18 years old, participated in this study. The participants were first-year undergraduate students pursuing an engineering degree in 2015 at the Srinivasa Ramanujan Institute of Technology (SRIT), an engineering college in the Ananthapur District, a semi-urban region in the state of Andhra Pradesh, India.

Research instruments and procedures

Two qualitative and standardized Vocabulary Levels Tests (VLT) were applied to the first-year undergraduate engineering students. The tests were based on standard vocabulary tests available in the literature. Vocabulary Levels Tests are employed not only for diagnostic purposes, but also for placement purposes across the world. These tests are useful in assessing the learners' general vocabulary knowledge and their particular receptive and productive vocabulary. Read (1998) remarks that the purpose of the VLT is to provide classroom teachers with a quick and practical way of assessing their students' vocabulary knowledge at the beginning of a course as well as to provide a basis for planning a vocabulary teaching and learning programme for a whole class or for a student in particular.

Vocabulary Levels Test (VLT)

Nation (1983) designed the original version of the Vocabulary Levels Test to measure and estimate students' vocabulary knowledge. Although this test is widely used in the field of vocabulary research, it has not been properly validated. Consequently, Schmitt *et al.* (2001) proposed two more versions of the receptive Vocabulary Levels Tests with 30 questions instead of 18 questions at every word frequency level. This provides more valid and reliable test results. Our study used Version 1 of Schmitt *et al.*'s (2001) Receptive Vocabulary Levels Test to assess the students' receptive vocabulary knowledge.

The Receptive Vocabulary Levels Tests comprises five different word levels where the first four general vocabulary tests are based on the 2,000-, 3,000-, 5,000- and 10,000-word frequency levels. The fifth level is based on Coxhead's Academic Word List, a list of words often used in academic writing beyond the first 2,000-word level (Coxhead, 2000). The Receptive Vocabulary Levels Tests involve matching words with their definitions, as shown in the example below taken from the 2,000-word frequency levels test:

- 1 choice
- 2 crop _____ meat
- 3 flesh _____ heat
- 4 salary _____ money paid regularly for performing a job
- 5 secret
- 6 temperature

Our study used, Laufer and Nation's (1999) Productive Vocabulary Levels Test to assess the students' productive vocabulary knowledge. This test consists of four general vocabulary tests based on the 2,000-, 3,000-, 5,000- and 10,000-word frequency levels and an academ-

ic vocabulary test based on the University Word List (Xue and Nation, 1984). The productive levels test is a sentence completion task that requires participants to fill the gaps with an appropriate target word using clues from varying initial letters. The productive levels test consists of 18 questions, each one structured like in the example below taken from the 2,000-word frequency level.

He was riding a *bi* _____.

Both vocabulary levels tests, each one 50 minutes long, were administered to students separately with prior notice at the beginning of the first-year to assess their vocabulary knowledge. The tests were conducted sequentially during their regular class hours by providing the printed test papers. Participants were asked to write down their responses and verify them before submitting the test sheets. Test scores were then converted into vocabulary size and the students' receptive and productive word ranges were calculated using the SPSS software, version 22.0.

Results and discussion

The first research question was meant to explore the differences in word frequency levels in the receptive and productive vocabulary knowledge of first-year undergraduate engineering students. The receptive vocabulary test scores were converted into word frequency levels as shown in Table 1.

The results of the receptive vocabulary test scores converted into word levels showed a mean score of 26.5 at the 2,000-word frequency level, 20.6 at the 3,000-word frequency level, and 20.0 at the 5,000-word frequency level. They also showed a very low mean score of 8.6 at the 10,000-word frequency level. However, the students' performance was better in the academic word level test, with a mean score of 20.2. Thus, the results of the receptive vocabulary test scores show that the students' mean scores decreased as word frequency levels increased, except in the academic word frequency level test.

Table 1. Receptive VLT scores (mean and standard deviation) (N=90).

Word frequency level	Mean	Standard deviation
2,000	26.5	3.7
3,000	20.6	4.9
5,000	20.0	5.0
10,000	8.6	3.9
Academic	20.2	7.3

We then converted the productive vocabulary test scores into word frequency levels, as shown in Table 2.

The results of the productive vocabulary test scores converted into word frequency levels showed a mean score of 14.5 at the 2,000-word frequency level, 5.2 at the 3,000-word frequency level, and 4.0 at the 5,000-word frequency level. However, the students scored a mean of 7.1 at the 10,000-word frequency level, which is higher than the scores at the 3,000- and 5,000-word levels. Their lowest mean score 2.3, was at the academic word frequency level.

The mean score differences between receptive and productive vocabulary levels tests were analyzed and laid out in Table 3.

As shown in Table 3, the students' receptive score was higher than the productive score at the 2,000-word frequency level, with a mean score difference of 12. Their receptive score was also higher than the productive score at the 3,000- and 5,000-word frequency levels, with a mean difference of 15.4 and 15.9, respectively. The lowest difference value was at the 10,000-word frequency level, with a mean score of 1.5 between the receptive and productive tests. However, the test scores show a higher mean score difference of 17.9 between the receptive and productive word level tests at the academic level. In other words, the results of the word frequency level tests reveal that the students' Receptive Vocabulary Levels Test scores are higher than their Productive Vocabulary Levels Test scores at every frequency level. This clearly indicates that students' receptive vocabulary knowledge is higher than their productive vocabulary knowledge. Therefore, we can clearly infer that they know more receptive words than productive words.

The second research question aimed at finding the difference between the students' receptive and productive vocabulary sizes. In order to do this, we converted the VLT scores into vocabulary size. Mean, percentage and difference values are presented in Table 4.

As shown in Table 4 the students' scores reveal a mean receptive vocabulary size of 6,775 words, (67.7%) and a mean productive vocabulary size of 4,006 words,

Table 2. Productive VLT scores (mean and standard deviation) (N=90).

Word frequency level	Mean	Standard deviation
2,000	14.5	2.7
3,000	5.2	2.1
5,000	4.0	2.4
10,000	7.1	2.7
Academic	2.3	1.7

Table 3. Mean Score differences in receptive and productive VLT (mean and difference) (N=90).

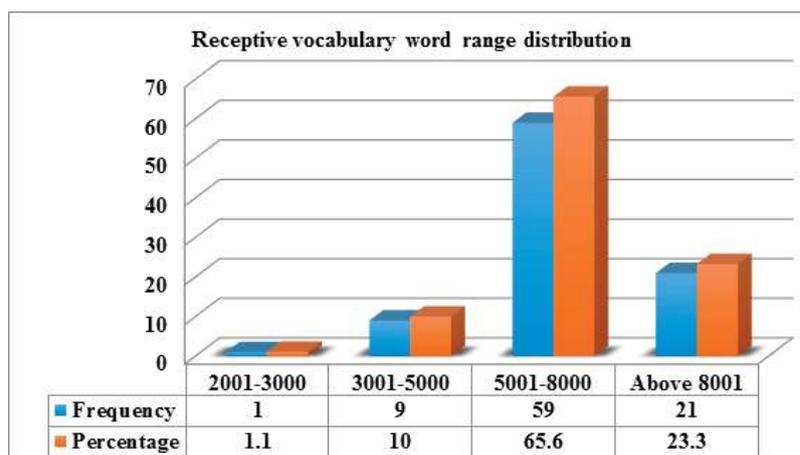
Word frequency level	Mean scores		Difference
	RVLT	PVLT	
2,000	26.5	14.5	12
3,000	20.6	5.2	15.4
5,000	20.0	4.0	15.9
10,000	8.6	7.1	1.5
Academic	20.2	2.3	17.9

Note: (*) RVLT: Receptive Vocabulary Levels Test; PVLT: Productive Vocabulary Levels Test.

(40.6%). In other words, their receptive vocabulary knowledge is 27.69% higher than their productive vocabulary. Overall, the results show that the students' receptive vocabulary size is larger than their productive vocabulary size.

We then calculated the frequency distribution of the students' receptive and productive vocabulary sizes, and the word ranges are presented in Figures 1 and 2.

Figure 1 illustrates the frequency distribution of the students' receptive vocabulary size and the corresponding word range distribution. Only one (1.1%) student placed in the 2,001–3,000-word range. While, nine (10%) students placed in the 3,001–5,000-word range. Most participants (59 or 65.6% of the sample) placed in the 5,001–8,000-word range. Only 21 students (23.3%) scored above the 8,001-word range. This shows that the receptive vocabulary word range of most students falls between 3001 and 5000 words.

**Figure 1.** Receptive vocabulary word range distribution (frequency and percentage) (N=90).**Table 4.** Receptive and productive vocabulary sizes (mean, percentage and difference) (N=90).

Vocabulary sizes	Mean	%	Difference
Receptive	6775	67.75	27.69
Productive	4006	40.06	

Figure 2 illustrates the frequency distribution of the students' productive vocabulary size and the corresponding word range distribution. Three (3.3%) students scored below the 2,000-word range, 10 (11.1%) students placed in the 2001–3,000 word range and 63 (70%) students placed in the 3001–5,000-word range. However, only 14 students (15.6%) placed in the 5001–8,000 range. Clearly, the productive vocabulary word range is lower than the receptive vocabulary word range distribution above the 5000-word level. These results unambiguously show the differences between the receptive and productive vocabulary knowledge levels of first-year undergraduate engineering students.

Interpretation

The results in this study show the differences between students' receptive and productive word frequency level test scores. Regarding word frequency levels, the highest difference between receptive and productive vocabulary was found at the 2000-word level in both tests. In the subsequent word levels, receptive scores were higher than productive scores, and the differences found were also higher than at the 2000-word level. Similarly, the difference in academic word levels indicates that the students' academic receptive vocabulary is higher than

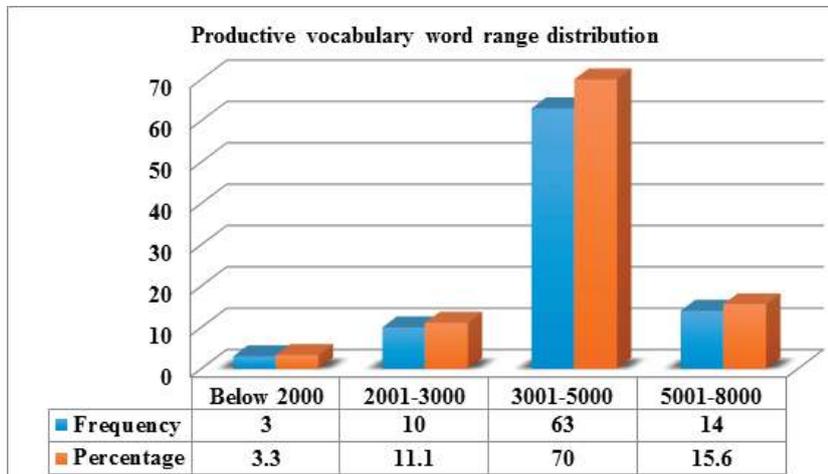


Figure 2. Productive vocabulary word range distribution (frequency and percentage) (N=90).

the academic productive vocabulary. Overall, these results show that students know more words receptively than productively and that there is a wide gap between both types of vocabulary.

The study also reveals a clear difference between the students' receptive and productive vocabulary sizes. The average receptive vocabulary is 6,775 words, whereas the average productive vocabulary is 4,006 words, indicating a difference of 27.69% between them. These results corroborate the findings of other researchers (Waring, 1997; Laufer, 1998; Webb, 2008; Zhou, 2010; Hajiyeva, 2014, 2015) and confirm that students' receptive vocabulary knowledge is higher than their productive vocabulary. In fact, the ESL first-year undergraduate engineering students displayed a higher average lexical knowledge compared to other ESL and EFL students examined in previous research articles reviewed in this study.

Conclusion

This research study was carried out to explore differences in the word frequency levels of first-year undergraduate engineering students from a semi-urban region and to identify the difference between their receptive and productive vocabulary size. Results showed a clear difference in word frequency levels. The Students' receptive word frequency level knowledge is higher than their productive word frequency level. The findings also show a difference of 27.69% between receptive and productive vocabulary size. This indicates that the first-year undergraduate students' receptive vocabulary size is far ahead of their productive vocabulary size. The students' receptive vocabulary size achieved the threshold level, but the productive vocabulary size fell below the required threshold level of 4,000–5,000 words. Thus, first-year undergraduate engineering students may have

issues in speaking and writing due to a less productive vocabulary knowledge.

We recommend that the curriculum for semi-urban first-year undergraduate engineering students include well planned, activity-based vocabulary instructions. We also suggest including activities based on the available online resources, which students could use to learn and incorporate words into their productive vocabulary. Furthermore, we also recommend a combination of vocabulary instruction with communicative activities, which could help students enhance both their receptive and productive vocabulary knowledge. Teachers could try the explicit approach of teaching vocabulary through the available general and academic word lists and also include vocabulary enhancement activities such as crossword puzzles, word chains, online dictionary activities, story writing with hints and enacting roleplays, etc., to practice receptive and productive vocabulary skills. Most importantly, teachers should consider vocabulary tests as an integral part of their vocabulary instruction in the regular classrooms.

Limitations of the study

This study explored the word frequency levels and identified the differences in receptive and productive vocabulary sizes of first-year undergraduate engineering students in India. Due to the sample limitations, we cannot claim that all first-year undergraduate engineering students have the same word levels and receptive and productive vocabulary sizes and the results do not represent undergraduate students in graduate programmes other than engineering. Another limitation is the fact that the findings cannot be generalized to undergraduate engineering students from an urban region. Furthermore, this study assessed only the students' lexical breadth, with no conclusions regarding depth of vocabulary knowledge.

Further studies are needed to assess the students' vocabulary using a set of vocabulary test that could measure depth in addition to breadth.

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