Promoting vocabulary development with EdTech

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This paper reviews key principles in second language vocabulary learning that should be used to guide the design of EdTech products that aim at developing users' vocabulary knowledge.

INTRODUCTION

Words are the building blocks of language and an essential component in every aspect of our lives (Nation & Webb, 2017). Vocabulary knowledge is a key element of second language proficiency and crucial to achieve successful communication. Research has shown that, in order to reach successful comprehension of a wide range of written and spoken texts, learners need to know around 6,000-7,000 and 8,000-9,000 word families respectively (Nation, 2006). Although estimates of vocabulary knowledge reported in previous studies have varied, the general agreement is that second language learners need to acquire knowledge of a large number of words to successfully operate in a second language. Importantly, research has shown that the vocabulary sizes of learners are typically below these requirements (e.g., Laufer, 2001; Shillaw, 1995). Thus, a key concern of vocabulary researchers and practitioners has been to find the most effective approach to learn and teach vocabulary and to support learners in achieving these large vocabulary learning targets. Developing learners' vocabulary knowledge also features high in the EdTech agenda, with many EdTech products either specifically focusing on learning vocabulary or including a vocabulary learning component.

In this piece I provide a brief review of some of the main issues and principles in vocabulary learning that should be considered in the design of EdTech products, in order to ensure that the possibilities for vocabulary learning are maximised. The purpose of this paper is to support EdTech designers in making well-founded decisions about the vocabulary learning components of their products.

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COMPONENTS OF VOCABULARY KNOWLEDGE

Many EdTech products and services are designed to help users to expand and improve their vocabulary knowledge, but what does "vocabulary knowledge" mean? What does it mean to "know" a word? This question has been at the core of vocabulary learning research. Vocabulary knowledge refers to both the number of words known (i.e., vocabulary size) and how well those words are known (i.e., vocabulary depth).

Vocabulary is a multi-component construct. A large amount of information needs to be known and manipulated to use words fluently (Schmitt & Schmitt, 2020). Several frameworks for vocabulary knowledge have been suggested. Nation's (2013) word knowledge framework is perhaps the most widely use taxonomy of vocabulary knowledge. As illustrated in Figure 1, knowing a word means being able to know its form and meaning, as well as how to use it. Knowing the form of a word involves acquiring knowledge of its written and spoken form, and of its different word parts. Acquiring the meaning of a word does not only involve being able to link its form (written or spoken) to a meaning (or meanings), but also to know its different concepts, referents, and various associations. In order to use a word accurately and fluently, learners also need to acquire information about its grammatical functions, collocations (i.e., other words it typically occurs with), and constraints on its use (i.e., register, frequency).
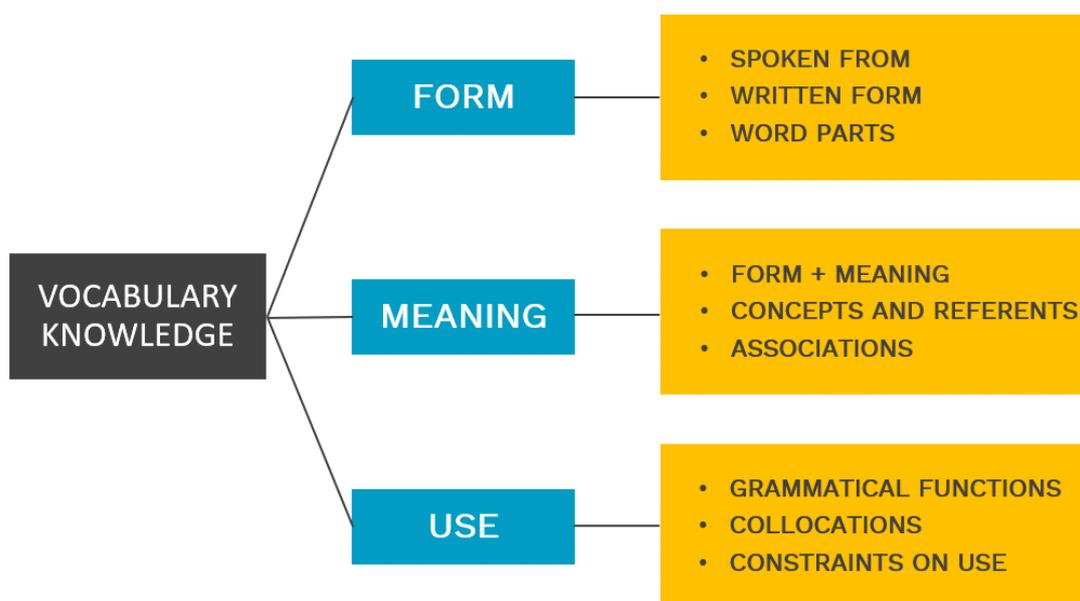

Figure 1. Components of word knowledge (adapted from Nation, 2013, p. 49).

Mastering all the components included in Figure 1 indicates complete knowledge of a word but fully acquiring these many components is challenging for learners. For the majority of words that learners know, it is likely that knowledge will be partial. For example, learners often know the core meaning of a word but might not know other secondary meanings. Vocabulary knowledge is incremental, and learners build knowledge of these different components gradually.

A further important distinction is that between receptive and productive knowledge:

- **Receptive vocabulary knowledge:** Learners' ability to understand words in reading or listening.

- **Productive vocabulary knowledge:** Learners' ability to produce words in speaking or writing.

Each of the components in Nation's (2013) framework represented above (Figure 1) needs to be mastered at both receptive and productive levels. For example, knowledge of the spoken form of a word would entail knowledge of how the word sounds and knowledge of how the word is pronounced.

Finally, although vocabulary learning research has traditionally focused on the acquisition of individual words, a high proportion of language is formulaic. Words have a tendency to occur as part of larger units and phrases that work together in communicating meaning. Examples of formulaic language include idioms (e.g., once in a blue moon), collocations, (e.g., heavy rain), phrasal verbs (e.g., make up), among others (see Siyanova-Chanturia & Pellicer-Sánchez, 2019, for a recent review of research on formulaic language in second language learning). Research has shown that formulaic sequences pervade language and that learners' knowledge of formulaic sequences often lags behind their knowledge of individual words. There is now consensus that vocabulary learning programmes should include formulaic sequences and EdTech products have also started to reflect this.

In sum, learners need to acquire knowledge of many different words (vocabulary size) and they need to know many things about those words (vocabulary depth). In addition, vocabulary knowledge includes knowledge of both single words and formulaic sequences. Crucially, mastering knowledge of a word or sequence means being able to acquire information about its different aspects of form, meaning, and use and being able to master that knowledge at both receptive and productive levels. It is, of course, challenging that a particular product addresses all of these many components of vocabulary knowledge and that does so at the various levels

of lexical mastery. However, we would expect a well-designed and balanced vocabulary programme to address the multicomponent nature of vocabulary knowledge. Designers and material writers should consider which component/s of lexical mastery a particular product is targeting and consequently, what type of improvement is expected.

APPROACHES TO VOCABULARY LEARNING

New words can be learned in different ways. Vocabulary learning approaches are usually divided into two main types: intentional and incidental. Intentional learning is described as the learning condition where learners' attention is focused directly on the words to be learned and there is deliberate intention to learn vocabulary (Schmitt, 2000). Learning from vocabulary activities and flash cards would be examples of intentional vocabulary learning. On the other hand, incidental learning occurs when learners are using the language for communicative purposes and new words are learned as a by-product of the communicative activity (Schmitt, 2000). Learning while reading a text, listening to songs, or watching a movie for pleasure would be examples of incidental learning.

There are many studies that investigate the effectiveness of these vocabulary learning approaches. Research has shown that new vocabulary can be learnt intentionally from a wide range of activities, as for instance flashcards (Nakata, 2011), word lists (Mondria & Wiersma, 2004), and cloze exercises (Rott, 2012). Studies have also shown that learners can expand their vocabulary knowledge incidentally from reading (Pellicer-Sánchez, 2016, 2017; Pellicer-Sánchez & Schmitt, 2010, Webb, 2007), listening (Pavia, Webb, & Faez, 2019; van Zeeland & Schmitt, 2013), and watching television (Feng & Webb, 2020; Peters & Webb, 2018).

While research has shown that both approaches lead to considerable gains, research comparing incidental and intentional conditions have generally shown that intentional learning leads to higher vocabulary gains in the short term (e.g., Laufer, 2006). In a recent study, Pellicer-Sánchez, Conklin and Vilkaitė-Lozdienė (2020) compared the relative effectiveness of different approaches (i.e., incidental learning from reading, intentional learning from focused activities, and a combination of intentional and incidental) on the acquisition of several aspects of vocabulary knowledge (form recognition, meaning recognition, and meaning recall). Results showed that meaning recognition and recall gains from the intentional condition (i.e., learning words through a matching exercise) were significantly higher than those from the incidental learning condition (i.e., learning from reading) (see Figure 2).
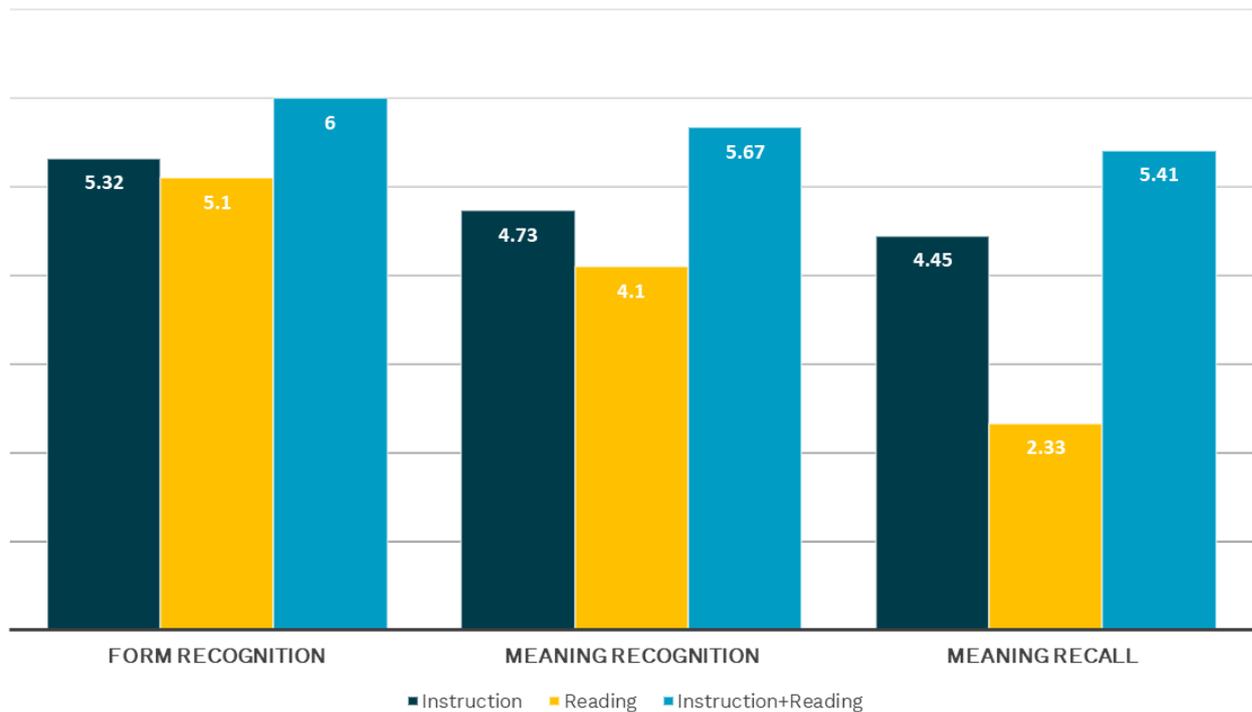
Figure 2. Vocabulary gains reported in Pellicer-Sánchez, Conklin, and Vilkaitė-Lozdienė (2020)

It is worth noting that, despite the reported advantage of intentional approaches, intentional learning cannot account for the large number of words that second language learners need to acquire, nor for the many aspects of each word or sequence that they should learn. Thus, research on the effectiveness of vocabulary learning conditions always conclude that a combination of intentional and incidental approaches is needed for learners to be able to build the large vocabulary sizes required for successful language use. In fact, the study by Pellicer-Sánchez, Conklin, and Vilkaitė-Lozdienė (2020) showed that vocabulary gains from a combination of intentional and incidental approaches (i.e., matching activity + reading) were significantly higher than those from instruction-only and reading-only conditions for the three lexical aspects examined (see Figure 2). This advantage of combined approaches has also been reported in the acquisition of formulaic sequences (Le-Thi, Rodgers, & Pellicer-Sánchez, 2017).

OTHER FACTORS CONTRIBUTING TO VOCABULARY LEARNING

In addition to the specific approach adopted (i.e., incidental, intentional, or both), many other factors influence the success and effectiveness of a vocabulary learning condition. While a comprehensive review of all factors affecting vocabulary learning is beyond the scope of this article (for a recent review see Peters, 2020, and Boers, 2020), I draw attention here to two key

factors that have received considerable attention in vocabulary learning research:

1) **Repetition:** Frequency of encounters with new words is the factor that has probably received the most attention from vocabulary researchers. Learning is more likely to occur if learners encounter new items several times. Repeated encounters provide learners with opportunities not only to acquire knowledge of new words/phrases but also to consolidate and expand previously acquired knowledge. It is also through repeated encounters with previous unknown words/phrases that learners acquire the different components of lexical mastery identified above. Vocabulary learning is incremental and every encounter with a previously unknown word contributes to its learning.

2) **Noticing:** In order to learn a word or phrase, learners need to notice it and pay attention to it. This is particularly important in incidental learning conditions where learners might not notice unknown words in the input (i.e., the text they are reading, or the video they are watching). Vocabulary researchers have explored different ways to increase the salience of words/phrases, as more salient items are more likely to be noticed by learners and this will positively influence learning. One of the most commonly used strategies is typographical enhancement, i.e., the manipulation of fonts through bolding, underlining, colouring, etc.

These factors, among others, have been shown to contribute to successful vocabulary learning and should therefore be considered in the design of vocabulary learning programmes and products.

MODELS OF VOCABULARY TEACHING

As argued above, a common conclusion in vocabulary learning research is that intentional and incidental conditions should be combined and that learners should be given opportunities to learn new words and formulaic sequences through these different approaches. This is reflected in the most influential frameworks for vocabulary teaching, which state that a well-balanced vocabulary learning programme should provide sufficient opportunities for both incidental and intentional learning (e.g., Nation, 2007; Schmitt, 2008), as well as receptive and productive learning (Webb & Nation, 2017).

One such frameworks is Nation's (2007) Four Strands, which posits that the activities in a language course can be divided into the strands of meaning-focused input (i.e., learning through listening and reading), meaning-focused output (i.e., learning through speaking and writing), language-focused

learning (deliberate/intentional attention to language features), and fluency development (becoming fluent in speaking, listening, reading, and writing) (Figure 3).
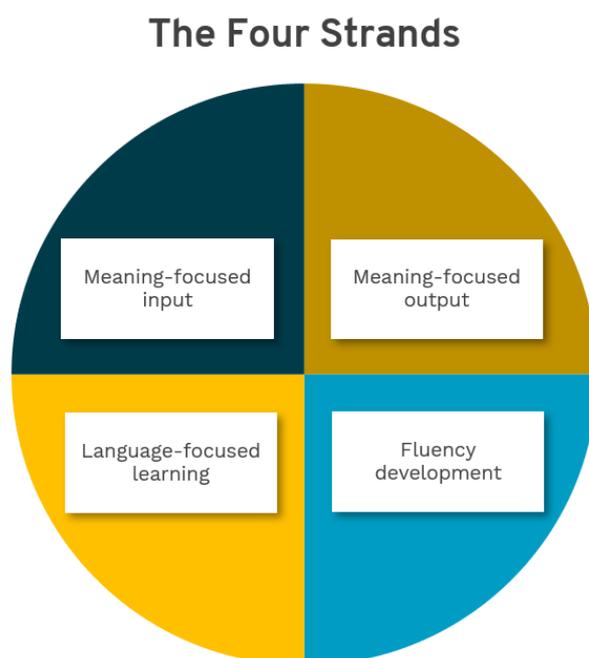
The Four Strands

Figure 3. The Four Strands principle (Nation, 2007).

CONCLUSION

This article has summarised some of the key vocabulary learning principles that should be considered in the design of EdTech products targeting vocabulary development. As argued earlier, it might be challenging for the same product to address all of the components at various levels of mastery (for both single words and formulaic sequences), and to ensure opportunities to engage in various learning conditions, particularly if the product is not designed exclusively to promote vocabulary knowledge. However, these considerations should help designers to ensure that EdTech provides learners with more effective means to improve their vocabulary knowledge and to maximise the opportunities for vocabulary learning.

REFERENCES

- Boers, F. (2020). Factors affecting the learning of multiword items. In S. Webb (Ed.), *The Routledge handbook of vocabulary studies* (pp. 143-157). New York: Routledge.

- Feng, Y., & Webb, S. (2020). Learning vocabulary through reading, listening, and viewing: Which mode of input is most effective? *Studies in Second Language Acquisition, 42*(3), 499-523. doi:10.1017/S0272263119000494

- Laufer, B. (2001). Quantitative evaluation of vocabulary: How it can be done and what it is good for? In C. Elder, K. Hill, A. Brown, N. Iwashita, L. Grove, T. Lumley, T. McNamara (Eds.). *Experimenting with uncertainty.* Cambridge: Cambridge University Press.

- Laufer, B. (2006). Comparing Focus on Form and Focus on Forms in Second-Language Vocabulary Learning. *Canadian Modern Language Review, 63*(1), 149-166. doi: 10.3138/cmlr.63.1.149

- Le, D. T., Rodgers, M. P.H., & Pellicer-Sánchez, A. (2017). Teaching formulaic sequences in an English-language class: The effects of explicit instruction versus coursebook instruction. TESL Canada Journal, 34(3), 111-139. Doi: 10.18806/tesl.v34i3.1276

- Mondria, J. A., & Wiersma, B. (2004). Receptive, productive, and receptive + productive L2 vocabulary learning: what difference does it make? In P. Bogaards & B. Laufer (Eds.), Vocabulary in a second language: selection, acquisition, and testing (pp. 79-100). Amsterdam: John Benjamins.

- Nakata, T. (2011). Computer-assisted second language vocabulary learning in a paired-associate paradigm: a critical investigation of flashcard software. *Computer Assisted Language Learning, 24*(1),17-38. doi: 10.1080/09588221.2010.520675

- Nation, I. S. P. (2006). How large a vocabulary is needed for reading and listening? *Canadian Modern Language Review, 63*, 59–82. doi: 10.3138/cmlr.63.1.59

- Nation, P. (2007). The Four Strands. *International Journal of Innovation in Language Learning and Teaching, 1*(1), 2-13. doi: 10.2167/illt039.0

- Nation, I.S.P. (2013). *Learning vocabulary in another language* (2nd edn.). Cambridge: Cambridge University Press.

- Pavia, N., Webb, S., & Faez, F. (2019). Incidental vocabulary learning from listening to L2 songs. *Studies in Second Language Acquisition, 41*(4), 745-768. doi: 10.1017/S0272263119000020

- Pellicer-Sánchez, A. (2016). Incidental L2 vocabulary acquisition from and while reading: An eye-tracking study. *Studies in Second Language Acquisition, 38,* 97–130. doi: 10.1017/S0272263115000224.

- Pellicer-Sánchez, A. (2017). Incidental learning of L2 collocations: A classroom study. *Language Teaching Research, 21*(3), 381-402. doi: 10.1177/1362168815618428.

- Pellicer-Sánchez, A., Conklin, K., & Vilkaitė-Lozdienė, L. (2020). The effect of pre-reading instruction on vocabulary learning: An examination of L1 and L2 readers' eye movements. *Language Learning, 71*(1), 162-203. doi: 10.1111/lang.12430

- Pellicer-Sánchez, A., & Schmitt, N. (2010). Incidental vocabulary acquisition from an authentic novel: Do things fall apart? Reading in a Foreign Language, 22, 31–55.

- Peters, E. (2020). Factors affecting the learning of single-word items. In S. Webb (Ed.), *The Routledge handbook of vocabulary studies* (pp. 125-142). New York: Routledge.

- Peters, E., & Webb, S. (2018). Incidental vocabulary acquisition through watching a single episode of L2 television. *Studies in Second Language Acquisition, 40*(3), 551-577. doi:10.1017/S0272263117000407

- Rott, S. (2012). The Classification of Lexical Intervention Tasks: An Approximate Replication of Laufer and Hulstijn (2001). In G. Porte (Ed.), R*eplication Research in Applied Linguistics and Second Language Acquisition: A Practical Guide* (pp. 228-267). Cambridge: Cambridge University Press.

- Siyanova-Chanturia, A. & Pellicer-Sánchez, A. (2019). *Understanding formulaic Language: A second language acquisition perspective*. New York: Routledge.

- Schmitt, N. (2000). *Vocabulary in Language Teaching*. Cambridge: Cambridge University Press.

- Schmitt, N. (2008). Instructed Second Language Vocabulary Learning. *Language Teaching Research 12*(3), 329-363. doi: 10.1177/1362168808089921

- Schmitt, N. & Schmitt, D. (2020). *Vocabulary in language teaching* (2nd edn.). Cambridge: Cambridge University Press.

- Shillaw, J. (1995). Using a word list as a focus for vocabulary learning. *The Language Teacher*, *19*(2), 58-59.

- van Zeeland, H. & Schmitt, N. (2013). Incidental vocabulary acquisition through L2 listening: a dimensions approach. *System, 41*, 609-624. doi: 10.1016/j.system.2013.07.012

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

- Webb, S. & Nation, P. (2017). *How vocabulary is learned*. Oxford: Oxford University Press.