

Teaching vocabulary through deliberate and incidental activities: Integrating AI and online tools for deeper learning

By Elif Once-Buyukerol & Mohammad Reza Montazeri, Canada

Introduction

Vocabulary learning can occur deliberately or incidentally, but these approaches may differ in purpose, process, and effectiveness. Deliberate learning of second language (L2) vocabulary refers to intentional learning of words, in which learners focus on memorizing or practicing words through activities like flashcards, dictionaries, or word exercises (e.g., Nakata, 2020). On the other hand, incidental learning pertains to the learning of vocabulary as a by-product of meaning-focused tasks rather than through explicit memorization (Boers, 2020). For example, learners may be reading or listening and picking up new words without the deliberate intention to study them.

Research has shown that deliberate learning is particularly important for beginning-level learners, which leads to faster short-term gains (Webb et al., 2022). On the other hand, incidental learning tends to be slower and less direct than studying word lists or flashcards, since new words do not appear often enough for beginners to notice and remember them easily. However, for more advanced learners, repeated exposure to words in meaningful contexts can be especially fruitful, as they are better able to notice, infer, and retain new vocabulary over time (Webb, 2020).

Both deliberate and incidental vocabulary learning play essential roles in L2 development. Deliberate learning allows learners to focus on specific words and meanings, building a foundation of essential vocabulary through activities such as flashcards, dictionaries, or targeted exercises. Incidental learning, in contrast, occurs naturally through exposure to meaningful language in context, helping learners acquire the vast number of words needed to use English effectively. Research has shown that to read independently in English, L2 learners need to know approximately 8,000–9,000 word families (Nation, 2006). Given the sheer size of this vocabulary, combining deliberate study with rich, contextual exposure ensures both a robust foundation and ongoing, deeper learning of words.

L2 teachers are, therefore, encouraged to integrate the affordances of both teaching methods to maximize the learning gains. Current technology could facilitate this process. Particularly, the advent of Artificial

Intelligence (AI) has revolutionized vocabulary learning, allowing teachers to harness AI tools judiciously to teach vocabulary items either deliberately (through various exercise types) or incidentally (through reading, listening, reading-while-listening, and viewing). In what follows, we will expound on the affordances of each method through the lens of technology and AI. Due to its widespread use in textbooks and classroom practices, the first section will focus on gap-filling exercises as a key component of deliberate vocabulary learning. The second section will delve into various modes through which vocabulary is presented incidentally. We will finally culminate with some practical Do's and Don'ts for utilizing technology in vocabulary learning.

Deliberate learning of vocabulary through technology and AI

Deliberate learning plays a key role in vocabulary instruction (Pellicer-Sanchez, 2020). Research has consistently shown the benefits of explicit instruction and intentional learning activities for vocabulary development (Gardner & Davies, 2007; Webb & Kagimoto, 2009). This is especially true for multiword items such as idioms (*e.g., kick the bucket*) and phrasal verbs (*e.g., let down*) which are often more difficult to learn and recall since the overall meaning of them is often different than their individual parts.

This emphasis on deliberate vocabulary learning is also reflected in instructional materials. Many widely used vocabulary textbooks include a range of explicit practice activities (Strong & Boers, 2019). Among these, gap-filling exercises stand out for their relevance to real-life communication. In these tasks, learners must infer or predict missing words based on context—a process that mirrors how meaning is often constructed during spontaneous conversation.

When examining common textbooks, two main types of gap-filling activities emerge:

- Free guessing, where no clue is provided (*e.g., She's got straight _____*) (*correct answer: hair*)
- Constraint guessing, where a partial clue is given (*e.g., She's got straight h_____ or she's got straight _____*). (*correct answer: hair*)

While research highlights the advantages of free guessing for long-term retention (Grimaldi & Karpicke, 2012), it also cautions teachers about the potential cognitive load it can impose on learners. Therefore, it is important for teachers to understand the benefits of free guessing exercise types and how to use them effectively in and beyond the classroom to reduce the cognitive load.

Integrating online tools for gap-filling exercises

As language teaching increasingly moves to digital environments, incorporating technology can make traditional exercises like gap-filling more engaging and effective. Several online tools can enhance learning experience. We highlight two user-friendly and lesser-known options: Edpuzzle (<https://edpuzzle.com>)

and Wooclap (<https://www.wooclap.com>).

Edpuzzle allows teachers to embed interactive questions directly into videos. Questions can range from multiple-choice to open-ended formats. While the tool can be used to teach any language skill, the open-ended question option is particularly useful for creating free guessing tasks. Teachers can upload videos from platforms like YouTube or use Edpuzzle's open library to edit materials shared by others. Embedding a gap-filling task at a specific moment in the video provides learners with meaningful context for vocabulary use. This not only makes learning more enjoyable but also transforms a traditional textbook activity into an engaging, multimodal experience.

Wooclap is another free platform that turns lessons into interactive experiences. It offers a variety of task types, from presenting information to assessing learners and gathering feedback. For vocabulary instruction, features such as "*Label an image*," "*Drag and drop*," and "*Find on image*" are particularly valuable for teaching new words alongside visuals. The "Fill in the blanks" activity also works well for assessing vocabulary in context. Moreover, Wooclap's automatic grading system can ignore minor spelling errors, and its built-in timer adds an element of fun and challenge. These features make Wooclap both teacher-friendly and highly effective for vocabulary learning and review.

Using AI to enhance vocabulary teaching for gap-filling exercises

The use of AI in language teaching is rapidly expanding, offering new opportunities for both teachers and learners. When preparing gap-filling activities, AI tools such as ChatGPT (<https://chat.openai.com>) can serve as powerful assistants helping to generate, edit, or adapt content quickly. However, effective use depends on crafting clear prompts. Teachers should be trained to communicate their instructional goals and learner profiles clearly to AI tools to get useful results. For example, teachers can prompt AI to "act as an English language teacher" or even "as an intermediate-level learner" to generate exercises from different perspectives. The content produced will vary significantly depending on the role and purpose provided.

AI tools are especially valuable for gap-filling tasks because they can:

- prevent repetition and boredom by generating diverse, contextualized, and even localized versions of the same exercise.
- support multiple modalities, making materials adaptable for in-class and online environments such as Zoom, Google Slides, or Jamboard.

- allow easy customization, letting teachers edit, add, or remove elements to match learners' proficiency levels.
- enable multimodal learning through the integration of videos, images, and audio files, making vocabulary learning more engaging.

By incorporating pre-, while-, and post-activity stages into AI-generated materials, teachers can create richer and more dynamic vocabulary learning experiences while maintaining pedagogical depth.

Incidental learning of vocabulary through technology and AI

Repeated exposure in meaningful contexts (i.e., through reading, listening, reading-while-listening, and viewing) can help learners develop a deeper understanding of how words are used in context and build fluent, automatic access to vocabulary (Ballance & Cobb, 2020). In essence, technology offers valuable tools for enhancing these input modes by providing rich, multimodal exposure to language in authentic contexts.

Vocabulary learning through reading with digital tools

Digital reading platforms have transformed how learners engage with texts, offering interactive and multimodal ways to build vocabulary beyond traditional print reading. Online tools such as graded e-books, and browser-based readers can also allow learners to click on words for instant, interactive, or sometimes pictorial glosses (i.e., definitions), translations, and pronunciation.

These digital reading environments now offer adaptive features that help learners notice and understand unfamiliar words without interrupting the flow of reading. For example, the ReadLang platform allows learners to click on unfamiliar words in online texts and immediately view their meaning in their first language; the system then records these items for spaced review later (Ridout, 2024).

Recent advances in AI-assisted language learning demonstrate how intelligent tools can personalize and support vocabulary development. For example, custom GPT scaffolding can provide explanations and step-by-step guidance, helping learners notice and practice new words in meaningful contexts (Liu & Ma, 2025). GPT also can make learning more engaging and manageable by offering individualized feedback and highlighting usage patterns.

For ESL (English as a Second Language) teachers, these findings suggest that GPT can act as an effective scaffold for noticing and practicing real word usage while teachers guide, monitor progress, and gradually reduce support. The following example classroom procedure, based on Liu and Ma's (2025) study, illustrates how teachers can implement GPT scaffolding in practice:

- **Warm-up:** The teacher introduces three new words (one noun, one verb, one adjective).

Students guess meanings or recall any known forms.

- **Context exploration:** Students read real sentences (concordance lines) showing these words in context. For example, the word *dynamic* appears in sentences like “She is a *dynamic* leader” or “The market is *dynamic* and changing.” Students notice patterns and try to infer meanings.
- **GPT scaffolding:** Students use prepared prompts to ask the GPT tutor questions, such as:
 - “Give me two more sentences using *dynamic* in business.”
 - “Which words usually go with *dynamic*?”
 GPT provides examples, explanations, or hints.
- **Practice/output:** Students write their own sentences using the new words and check with GPT or the teacher for feedback.
- **Assessment:** Teachers can give a short test on word use, form, and meaning, and later discuss results with students to reflect on learning.

Vocabulary Learning through Listening with Digital Tools

Extensive listening (listening for overall meaning rather than individual words, often in an enjoyable way) provides an enjoyable and effective way to learn vocabulary incidentally, especially multiword expressions. Interestingly, unlike previous preconceptions, recent research shows listening can be as effective, or even more so, than reading for learning these expressions because spoken language presents them in smooth, natural speech (i.e., meaningful units rather than as separate words) (Webb & Chang, 2020). This helps learners hear phrases like *give up* in “He didn’t *give up* after failing the first time” as a single, meaningful unit.

Extensive listening can also happen through listening to music. One particular study evinced that English song lyrics can be an enjoyable and powerful tool for teaching phrasal verbs, offering repeated, natural exposure, especially in Pop and Hip-hop music genres (Akbari et al., 2018). Based on the findings, Pop songs worked better for lower-level learners due to their repetition and clear language, while Hip-hop suited advanced learners with its wider range of expressions.

This type of listening can be enhanced with technology tools like LyricsTraining, which displays synchronized lyrics and highlights target words. Learners can interact with the lyrics by completing exercises and playing games, combining incidental vocabulary learning with active engagement (<https://lyricstraining.com>). Not only can this approach make learning enjoyable and memorable, but it can also reinforce word recognition and usage in context.

Both listening and reading help vocabulary learning, but research shows that combining them (i.e., hearing and reading a word at the same time) works even better. This kind of “dual input” aids the brain in remembering words more easily and using them later (Jung & Lee, 2023). It can also make learners more motivated and confident in using English (Vu & Peters, 2020).

To support bimodal input, digital platforms can combine listening and reading in engaging ways. To illustrate, the ReadLang platform allows learners to read texts while simultaneously listening to audio generated by the site, reinforcing word recognition and meaning through dual exposure. Likewise, listening materials can be created with NaturalReaders AI, a text-to-speech tool that produces clear, natural-sounding recordings with adjustable speeds, ensuring lower-proficiency learners can follow along without oversimplification (<https://www.naturalreaders.com>).

Vocabulary learning through viewing with digital tools

While reading and listening provide important exposure, viewing L2 content adds a layer of contextual richness that can make vocabulary more memorable. The benefits of this multimodal and adaptive input are supported by research, which shows that viewing, especially with captions, often outperforms reading or listening alone for incidental vocabulary learning (e.g., Teng, 2024). This is because watching L2 programs exposes learners to words in meaningful, multimodal contexts (through combining sound, text, and visuals) which helps them notice, understand, and remember new vocabulary.

Video-assisted platforms like YouGlish allow learners to hear words used in authentic speech across thousands of online videos. This platform furnishes L2 learners with multiple natural examples and native usage patterns that support incidental noticing and reinforce correct pronunciation (<https://youglish.com>). Learners can also adjust video speed to notice stress and rhythm in words and multiword expressions. Unlike traditional dictionaries, this platform also offers instant glossing to show word meanings in context.

Video-based learning can be optimized through using captions or subtitles. Subtitles, be it in English or in the first language, has proved to be conducive for vocabulary learning. Using bilingual subtitles (for example, showing both English and the first language) can be especially helpful (Chen, 2025). Learners can connect meaning and form more easily, follow the story without getting lost, and reinforce new vocabulary through repeated exposure. This approach supports both younger learners, who need more guidance, and more advanced learners, who benefit from seeing subtle differences in word use (Chen, 2025).

For ESL learners, this means that making use of AI tools such as YouTube’s automatic caption generation or bilingual subtitle plug-ins can replicate this advantage. Another powerful online platform for creating

subtitles for any video is Kapwing, which automatically generates captions, allows easy editing for accuracy, and supports multiple languages (<https://www.kapwing.com>).

Do's and don'ts of deliberate and incidental learning of vocabulary

Do's:

- **Encourage contextual guessing.** Integrate gap-filling exercises that encourage learners to predict missing words from context, as this mirrors real-life language use and strengthens inference skills.
- **Blend technology with pedagogy.** Experiment with digital tools and AI platforms such as Edpuzzle, Wooclap, or ChatGPT to make vocabulary practice interactive, multimodal, and adaptable to different proficiency levels.
- **Use meaning-focused, level-appropriate materials.** Select engaging texts, videos, or audio (e.g., graded readers, captioned videos) that let learners focus on meaning without being overwhelmed by unknown words.
- **Promote repeated, multimodal exposure.** Combine reading, listening, and viewing (using tools like ReadLang, YouGlish, or LyricsTraining) to recycle target words across varied contexts.
- **Integrate light reflection and AI support.** After tasks, briefly discuss or notice new words, and use AI tools as scaffolds (not substitutes) to explain usage, personalize input, and guide noticing while maintaining teacher oversight.

Don'ts:

- **Avoid repetition and overload.** Don't rely only on textbook-based or repetitive gap-filling exercises. Vary the content, difficulty, and context to sustain learner engagement and prevent cognitive fatigue.
- **Don't let AI lead without guidance.** Avoid using AI tools without clear instructional goals or well-structured prompts. Ambiguous directions can result in irrelevant or unproductive materials rather than meaningful learning opportunities.
- **Don't depend solely on AI glosses.** Overreliance on instant translations weakens contextual guessing and independent noticing.

- **Don't let technology be passive.** Encourage active interaction (such as clicking, replaying, or discussing) and include occasional follow-up to reinforce retention.

Conclusion

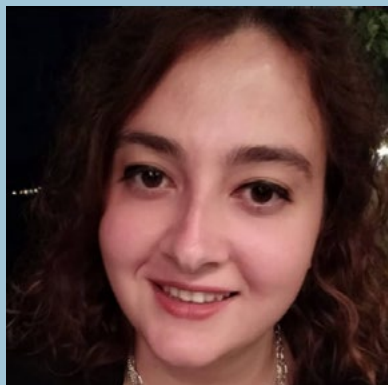
Both deliberate learning (particularly free gap-filling exercises) and incidental learning play essential roles in vocabulary teaching and learning. To make these approaches more effective, enjoyable for students, and time-efficient for teachers, the thoughtful and informed use of online tools and AI is key. By integrating these activities and strategies, ESL teachers can better support learners in expanding and strengthening their vocabulary knowledge.

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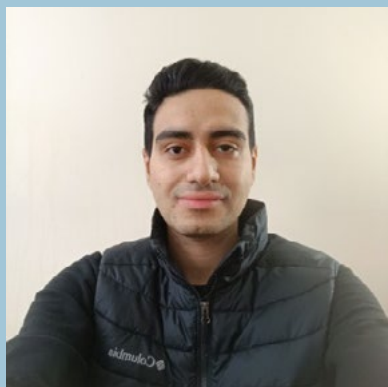
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Author Bios



Elif Once-Buyukerol is a PhD candidate in Applied Linguistics and Discourse Studies at Carleton University. She holds a bachelor's degree in English Language Teaching and a master's degree in Curriculum and Instruction. She taught EFL in Turkey for six years and is currently working as a Turkish instructor and a CELPIP speaking rater in Canada. Her research focuses on the effects of error on vocabulary learning, with particular emphasis on phrasal verb acquisition. She aims to contribute valuable insights to the field of second language acquisition. Correspondence concerning this article should be addressed to Elif Once-Buyukerol.

Email: ElifOnceBuyukerol@gmail.com



Mohammad Reza Montazeri is a PhD student in Applied Linguistics and Discourse Studies at Carleton University, Ottawa, Canada. Mohammad Reza has taught EFL and ESL for more than 10 years in Iran and Canada. He has also worked as an IELTS mock examiner and now serves as a CELPIP rater. Apart from being a teacher, Mohammad Reza is actively engaged in conducting research in Applied Linguistics. His research mainly focuses on L2 vocabulary learning and measurement, particularly formulaic sequences, including collocations, phrasal verbs, and lexical bundles. He has published in prestigious Applied Linguistics journals such as LTR, IRAL, and so forth.