

2015

Learning Vocabulary with Apps: From Theory to Practice

Qizhen Deng

University of Nebraska at Lincoln, qizhdeng@gmail.com

Guy Trainin

University of Nebraska-Lincoln, gtrainin2@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/nebeducator>

Part of the [Teacher Education and Professional Development Commons](#)

Deng, Qizhen and Trainin, Guy, "Learning Vocabulary with Apps: From Theory to Practice" (2015). *The Nebraska Educator: A Student-Led Journal*. 29.

<https://digitalcommons.unl.edu/nebeducator/29>

This Article is brought to you for free and open access by the Department of Teaching, Learning and Teacher Education at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in The Nebraska Educator: A Student-Led Journal by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Learning Vocabulary with Apps: From Theory to Practice

Qizhen Deng and Guy Trainin

Abstract: English vocabulary acquisition is a major challenge for English as a second or foreign language learners to become proficient in English. It is also a major challenge for English speakers who are at risk. With the increasing use of various mobile devices (e.g., iPad) for educational purposes we have a new opportunity to support vocabulary learning. Mobile devices have considerable potential for enhancing vocabulary acquisition and English learning among English learners. This article focuses on how mobile devices can be used to facilitate vocabulary learning for English learners. While there is a paucity of research on mobile platforms that enhance learning, we believe that a theoretical approach coupled with studies in vocabulary acquisition can point to relevant practices for all teachers and students. Based on these theories, we discuss how various mobile apps can be used to enhance vocabulary acquisition with four research-based vocabulary learning strategies: dictionary use, phonological analysis (i.e., learning words by analyzing the sound parts), morphological analysis (i.e., learning word meanings by analyzing the componential word parts), and contextual analysis (i.e., learning word meanings by referring to learning context).

Keywords: *affordance, apps, English learners, technology, vocabulary strategies, ipad, EFL, ELL, digital, learning, mobile*

Introduction

“The future is increasingly mobile, and it behooves us to reflect this in our teaching practice.” (Hockly, 2013, p.83)

Vocabulary learning is an essential part of acquiring a second language as words are the building blocks of a language (Francis & Simpson, 2009; Nation, 2001). In fact, vocabulary knowledge is a major determinant

of reading comprehension and language achievement for all learners (Kiefer & Lesaux; Nagy & Scott, 2001; Nation, 2001). The awareness of the vital role of vocabulary knowledge has led to a theoretical foundation followed by empirical studies focusing on effective vocabulary acquisition in both first and second language (Hairrell, Rupley, & Simmons, 2011; Nagy & Scott, 2001). One of the major obstacles to vocabulary acquisition is the individual nature of growing one's personal lexicon through personal reading. English presents a unique challenge because of its' polyglotic origin and wealth of vocabulary. In this paper, we suggest that mobile technology integration can provide such individualized learning accessible to all.

Mobile devices with robust Internet connections have proliferated in educational use since the advent of the iPad in 2010. The new mobile device ecosystems led to the rise of thousands of free or almost free applications (apps), which refer to compute programs designed to run exclusively on mobile devices. For instance, more than 775,000 apps were available as of January 2013 (Pure Oxygen Labs, 2013) that have the potential to help learners individualize immediate learning in ways that have never happened before. For example, empirical studies reported that iPad apps support the development of speaking, reading, and writing skills (Harmon, 2012; Lys, 2013; McClanahan, Williams, Kennedy, & Tate, 2012) and the enhancement of learning motivation (Kinash, Brand, & Mathew, 2012). Along with the potential, however, the burden of selecting apps that can actually support learning can bring confusion to students and teachers. In this paper we present the rationale for selecting apps that support vocabulary learning and select some examples that enhance such learning. We believe that many apps can afford innovative opportunities for vocabulary learning, not always the ones that are labeled for vocabulary learning; nevertheless, theory from the field of vocabulary acquisition research combined with affordances of the technology must be used to determine which apps have the potential to impact vocabulary acquisition among English learners.

This article is a preliminary attempt to identify and describe theory-based vocabulary learning mobile apps that will support English vocabulary acquisition in and out of the classroom. In addition, we

describe how the apps can be optimally used to enhance vocabulary learning with the guidance of four research-based vocabulary learning strategies.

Literature Review

Incidental and Intentional Learning

Incidental vocabulary learning refers to acquiring new words from various contexts without explicit instruction (Schmidt, 1994). The learning is incremental as learners use accumulated occurrences and contexts to form a more complete sense of word meanings. There is a consensus among researchers that once basic proficiency is established, most vocabulary is learned incidentally through reading and digital media and that fewer words are learned through intentional instruction. The sheer size of the vocabulary learning task (English has 400,000-600,000 words) leads to the realization that most words learned are a byproduct of authentic reading, listening, speaking, and writing activities (Hulstijn, 2001; Nagy & Herman, 1987; Schmitt, 2008; Shu, Anderson, & Zhang, 1995). Even for English learners, the number of words acquired by learners for proficient language use is greater than those that are explicitly taught in the classroom (Hirsh & Nation, 1992). In all likelihood, language instructors are able to teach only a small fraction of expected words in class and the rest need to be learned through exposure to language experiences outside the classroom.

Incidental vocabulary learning is highly individualized and depends on the language opportunities that individuals engage with. These experiences with language have been transformed in the digital age with increased access to print, audio, and multimedia products in English across the world. English learners today have access to a rich array of literary texts (e.g. project Gutenberg), personal texts (e.g. blogs), free access to news in English (e.g. CNN, BBC), and access to movies and video in English (e.g. YouTube). These new opportunities increase the chances to learn

English from varied and often authentic materials. These increased opportunities allow learners to follow their own interests but at the same time make vocabulary learning highly individualized. As a result, teachers that want to support these new opportunities must include a strategic approach to learning new vocabulary.

Intentional vocabulary learning, on the other hand, involves any activities aimed directly at acquiring new words by committing lexical information to memory, such as referring to a dictionary to learning a list of new words in a matching activity (Hulstijn, 2001). Intentional vocabulary learning is a must for a better chance of retention and mastery of specific vocabulary, with incidental learning being complementary (Laufer, 2005). Research has shown that both incidental and intentional learning are necessary for academic success.

Affordances of Mobile Devices

The concept of affordance was originally introduced by Gibson (1977) to explain the connection between perceiving and knowing. Gibson (1977) defined affordances as all “action possibilities” latent in the environment, independent of an individual’s ability to recognize them. Later, Norman (1988) revised the definition of affordance in the context of human-machine interaction as “the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used” (p. 9). For instance, a chair affords support and, therefore, affords sitting; it also affords stepping on to reach something. Likewise, mobile devices afford multiple modes of interaction (touch, voice, sight, sound) and a vast array of apps that can be used in multiple ways including learning. We claim that these affordances provide opportunities for students to learn vocabulary through multimodal interaction with apps.

With the understanding that technology can provide learning affordances (Norman, 1988), Klopfer and Squire (2008) discussed five advancements including: (1) *portability*—mobile devices can be easily carried and used anywhere, (2) *social interactivity*—mobile devices can be

used for collaborative work, (3) *context sensitivity*—mobile devices affords authentic contexts, (4) *connectivity*— mobile devices are connected to other devices through an array of local and cellular networks, and (5) *individualizing instruction*—apps on personal devices can provide user-specific scaffolding based on individual preferences and personal learning progress. These qualities open new opportunities for individualized learning and practice. There is a fit between the affordances of mobile devices and the needs of vocabulary learners. However, the acknowledgement of a fit is not enough; instructors must scaffold the use of mobile devices in order for language learners to maximize the benefits.

Affordances of Mobile Devices for Vocabulary Learning

Affordances can explain how students interact and learn with mobile devices during vocabulary learning. Learning with devices is at times different from the traditional vocabulary learning strategies and at other times complements or enhances such strategies. In order to learn with a mobile device, both students and teachers must first perceive the device as a learning tool. Many instructors and students view mobile devices as primarily social devices (in the case of phones) or gaming devices (in the case of iPads). For students to realize the affordances of mobile devices, they need to see its' potential to assist learning. Take the *Dictionary.com* app for example, learners must be familiar with it to know it provides a recording of a word that one can hear what it sounds like. The learner must also be aware of its function an English dictionary and thesaurus app that provides trusted definitions and origins with examples as well as smart control of learned vocabulary.

Clark (2013) conducted a experimental study to examine the effect of using one iPad application (i.e., *Vocabulary Builder*) on the vocabulary acquisition of elementary English learners. The control group completed a teacher-created worksheet whereas the experiment group used the iPad app. Results suggested the iPad app can support vocabulary acquisition. The visual and audio exposure provided by the iPad app increased vocabulary acquisition as English learners were both visually exposed by

graphics and auditorily stimulated by the sounds of words. Students who used iPad also showed a higher level of engagement and motivation in acquiring vocabulary. Similarly, Wang et al. (2015) investigated the effect of iPad apps on vocabulary acquisition and motivation of English learners at college level. Students in experimental group learned English vocabulary through the *Learn British English WordPower* app whereas students in control group learned English vocabulary through the semantic-map method. The authors suggested students using the iPad app performed better in vocabulary knowledge and reported higher engagement and motivation to learn vocabulary than those students in control group.

The use of mobile devices affords authentic and rich context for incidental and intentional vocabulary learning. For beginner students, teachers can choose apps that focus on constructive learning activities for individualized practice, such as using the app *Dragon Dictation* for pronunciation practice and *index card* apps for spelling practice. Advanced learners can not only use various dictionary apps to learn word meanings, but also acquire new words incidentally through listening to authentic stories or reading timely news report for content knowledge (e.g., the apps of *NPR News*, *This American Life*, *OverDrive*). A list of sample apps across platforms and their correspondent vocabulary learning strategies are presented in Table 1.

Vocabulary Learning Strategies and Related Apps

In this section we juxtapose research-validated approaches to vocabulary learning with the affordances of mobile apps.

Table 1

Apps Availability on Tablet Platforms and Related Vocabulary Learning Strategies

Apps	Tablet Platforms				Vocabulary Learning Strategies			
	iOS	Android	Surface App	Web Based	Dictionary Use	Phonological Analysis	Morphological Analysis	Contextual Analysis
Merriam-Webster Dictionary	X	X	X	X	X	X	X	
Dictionary.com	X	X	X	X	X	X	X	
The Free Dictionary	X	X	X	X	X	X	X	
Dragon Dictation	X	X	X ¹			X		
Hearbuilder Phonological Awareness	X					X		
Vocabulary practice: Greek and Latin	X						X	
Roots to Words	X						X	
Tangled Roots	X						X	
USA TODAY	X	X	X	X			X	X
NPR News	X	X	X	X			X	X
Kindle	X	X	X				X	X

Note. ¹ All apps are free except the price for Dragon Diction on Surface platform is \$19.99.

Dictionary use

According to Nation (2001), dictionaries serve three purposes: 1) comprehension – look up unknown words or confirm word deduced from context during listening, reading, or translating; 2) production – look up unknown words or word parts needed for speaking, writing, and translating; 3) learning – enrich knowledge of known words, such as etymology or different contextual usages.

Paul Nation (2001) also suggests that advanced English learners use dictionaries very well in receptive and productive ways (see also Jian, Sandnes, Law, & Huang, 2009). In receptive ways, learners are able to get information from the context where the word occurs, choose the right entry or sub-entry, relate the meaning to the context, and decide if it fits. In productive ways, they are able to find the wanted word forms, check that there are no unwanted constraints on the use of the word, work out the grammar and collocations of the word, and check the spelling or pronunciation of the word before using it. Empirical research confirms the importance of dictionary use by indicating that learners with a dictionary learned more words in both immediate and delayed tests than those without access to a dictionary (Macaro, 2005; Nist & Olejnik, 1995).

Before the proliferation of online dictionaries some researchers discouraged the practice of dictionary use and encouraged more contextual analysis to uncover the meaning of unknown words (Nesi & Haill, 2002). They advise students to use the dictionary as a tool of last resort, because looking up words creates a cognitive load that frequently interferes with short-term memory disrupting the process of reading comprehension. Many English as a foreign-language learners, however, rely heavily on dictionary use when they face new words while reading. This is because students find it hard to learn new words since they lack the large amount of comprehensible input needed to learn a word implicitly (Nagy & Herman, 1987). In addition, the meaning of new words cannot always be uncovered through contextual clues (Gonzalez & Gonzales, 1999; Laufer, 2003). In this case, it is crucial for English learners to resort to dictionary themselves.

Digital dictionaries solve the problem of cognitive load, allowing students to quickly and efficiently find a definition, etymology, use example and even audio of pronunciation. In some apps (e.g., *Kindle*, *iBooks*) the access occurs with a single touch of a finger over the word without even needing to lift the eyes away from the reading text. Taken together, digital dictionary use combines robust information (old affordance) with ease of access (digital affordance), a promising strategy for both incidental and intentional vocabulary learning.

Mobile Apps for Dictionary Use

Three popular and free English-English dictionaries are readily used: *Dictionary.com*, *Merriam-Webster Dictionary*, and *The Free Dictionary*. All three apps provide an English dictionary and thesaurus with extensive definitions, pronunciations, and etymologies; all three apps feature fresh daily contents (e.g., Word of the Day, News of the Day), and word origin. In addition, the app of *Dictionary.com* features voice search, multiple specialty dictionaries, audio pronunciations, and favorite words. *Merriam-Webster Dictionary* also provides voice search, example sentences, and audio pronunciation. *The Free Dictionary* features advanced search options, multiple encyclopedias, multiple specialty dictionaries, American and British audio pronunciations, plus the possibility of creating unlimited bookmarks of favorite words and encyclopedia entries, playing games, and sharing via social networks.

These dictionary apps afford learners the choices to look up definitions, pronunciations, etymology and synonyms or antonyms of words. If learners encounter unknown words when they are listening or reading for comprehension, they can look up the words or confirm guessed word meanings by referring to any of the dictionary apps at hand. In addition, they can check the etymology, pronunciations, or example sentences to facilitate reading comprehension. This is especially useful when many of the unknown words cannot be guessed through contextual clues (Nagy & Herman, 1987). *The Free Dictionary* also allows learners to enrich their understanding of word meanings at a deeper level by referring to authentic

sample sentences. These sample sentences are from the “reference” function that lists any available examples of how the words or phrases are used in works of classical literature as well as encyclopedia and Wikipedia. The full text of the relevant work is accessible by just clicking “view in context”. If we want learners to write and communicate in English, these dictionaries afford them a handy accessory to find wanted words with appropriate use in terms of context and grammatical forms. An example activity for second language learners is to compare the usage of these synonymous words: *dictate*, *decree*, *ordain*, *prescribe*, and *impose*, in order to decide which word to use for the context of “a certain country *imposes* a fine for text messaging while driving”. These electronic dictionaries also save users time compared to traditional dictionaries and, more importantly, save working-memory for comprehension processing rather than being disrupted by taking much time finding words in traditional dictionaries. In fact, both authors of this paper are English learners (albeit somewhat veteran) and still rely on the *Dictionary.com* app quite often.

Phonological Analysis

Phonological analysis in vocabulary learning refers to the translation of the graphemes in a word broken down into a sequence of sounds or phonemes (De Jong, Seveke, & Van Veen, 2000). When reading new words, students with high phonological sensitivity are more likely to store unfamiliar sound patterns in long-term memory (Baddeley, Gathercole, & Papagno, 1998; De Jong et al., 2000). The concept of the phonological loop supports the importance of phonological analysis as a vocabulary learning strategy (Walter, 2008). Phonological loop is part of information processing, and consists of two parts: a short-term phonological store and an articulatory rehearsal component (Baddeley, 1986). The short-term phonological store has auditory memory traces that are subject to decay over short periods of time, while the articulatory rehearsal component can reactivate the memory traces. Unfamiliar sound patterns of the words are encoded and decoded from long-term memory through phonological loop

in working memory (Baddeley et al., 1998). In a word, phonological analysis is an important strategy for English learners to strengthen their knowledge of sound patterns of new words and subsequently facilitate the storage of new words in long-term memory.

English learners have a considerable task encoding and decoding sounds in English. This difficulty is two fold. The first difficulty is that sound systems are not common in all languages. As a result learners of a new language are unaccustomed to the phonology of the new language and often cannot hear or produce some of the sounds clearly. For example speakers of Hebrew are not familiar with the /th/ sound. The second difficulty arises from the fact that English has a deep orthography and similar graphemes can be read differently in different words (e.g. gh in rough and dough), while different graphemes can have the same sound (e.g. rough and ruff). Access to mobile apps can allow learners to test or acquire new knowledge in an individualized way- increasing the odds that encoding of phonological information in long term memory will happen- and thus the personal lexicon will grow.

Mobile Apps for Phonological Analysis

We introduce five free apps for vocabulary learning using the strategy of phonological analysis: *Hearbuilder Phonological Awareness*, *Dragon Dictation*, as well as three dictionary apps including *Merriam Webster Dictionary*, *The Free Dictionary*, and *Dictionary.com* that were previously introduced. When facing a new word, learners can use these dictionaries to examine its pronunciation and listen to the sound in conventional English. These apps provide morpheme-grapheme correspondence, which helps students learn through articulatory rehearsal that reactivates the auditory memory traces. These traces lead to storage in long-term memory (Baddeley et al., 1998).

The app *Hearbuilder Phonological Awareness* offers activities to improve phonological awareness, such as segmenting or blending syllables and phonemes. It features a multi-level program with gradually increased difficulty. This app can be used either by learners to improve phonological

awareness with frequent built-in feedbacks or by teachers to teach or monitor students at all levels of phonological knowledge.

The app *Dragon Dictation* features voice-to-text transcriptions with convenient editing functions that provide a list of suggested words or phrases. The transcriptions can be saved or sent to other apps (e.g., message, email, Facebook, Twitter). English learners can use this app as a tool to practice and check their oral pronunciations by transcribing conversational voice to text. If the pronunciation or spoken language is not transcribed correctly, learners can refer to the feedback and transcribe the same content again to monitor the progress of oral pronunciations. Learners can save the transcription or send it to other platforms (e.g., Email or blogs) to record their learning process.

Morphological Analysis

In linguistics, a morpheme refers to a meaningful word part that cannot be divided into smaller meaningful parts (Aronoff & Fudeman, 2011). A morpheme may consist of a word, such as *land*, or a meaningful part of a word, such as *multi-*, *facet*, and *-ed* in the word *multifaceted*. Morphological analysis involves using morphological cues to break down a word in order to understand the meaning (Tong, Deacon, Kirby, Cain, & Parrila, 2011). The strategies of morphology analysis include detecting relationships between words from the same word family, breaking words into smaller meaningful parts, or detecting the grammatical role of a word from syntactic context (Nagy & Scott, 2001; Tong, et al., 2011). Morphological analysis emphasizes the awareness of the morphemic structure of words as well as the “ability to reflect on and manipulate the structure” (Carlisle, 1995, p. 194). It emphasizes active learning, which is a step beyond the concept of morphological awareness.

The value of morphological analysis lies in the fact that many unknown words can be learned through examining the morphemic parts, such as prefixes, suffixes, compounds, and word roots (Carlisle, 1995; Nagy & Scott, 2001; Nation, 2001). Morphological analysis explains in part the

rapid vocabulary growth observed in skilled first and second language English learners (Graves, 2009). Accumulated evidence shows students learn vocabulary faster when they can generalize morphological knowledge to derive and learn the meaning of new words (Goodwin & Ahn, 2010; Kieffer & Box, 2013). Nagy and Anderson (1984) estimated that for every word known by a learner, another one to three words are understandable by learners through morphological analysis.

French, Latin, and Greek roots are found to account for a large portion of English words. Nagy and Anderson (1984) reported that over 30% of written words have either inflected or derivational affixes and that the majority of these words are predictable based on the meanings of their word roots. Of the recently developed Academic Word List (Coxhead, 2000), more than 82% of the entries are of Greek or Latin origin. Because of the dominance of Latin and Greek roots in English vocabulary, being familiar with common word roots provides a useful basis for English learners to use the strategy of morphological analysis when dealing with morphologically complex words. This basis will further facilitate increasing the vocabulary size of learners. Indeed, students with better morphologic knowledge are able to recognize more words in reading contexts and, in general, are more accomplished in reading comprehension (Carlisle, 1995; Kieffer & Lesaux, 2012; Nagy, Berninger, & Abbott, 2006). Speakers of Romanesque (Latin based) languages such as Spanish or French can use the parallel root system (cognates) to quickly acquire meanings for morphological families.

Mobile Apps for Morphological Analysis

We provide three examples of mobile apps for students to enhance morphological knowledge: *Tangled Roots*, *Vocabulary Practice: Greek and Latin*, and *Roots to Words*. The app *Tangled Roots* presents a root, prefix, or suffix along with its meaning and the number of common American English words that are derived from it. Over six hundred of word roots and affixes are included in this app. The learner must guess and recall as many derived words as possible to finish the task. If the learner cannot

recall, he or she can check the answer to learn what the list of words are that share the same root or affix. The second app, *Vocabulary Practice: Greek and Latin*, is a game that allows learners to practice the questions on over 250 Greek and Latin roots that are embedded in either words or sentences. This app features smart learning with progressively harder levels. Learners earn points as they learn, which motivate the learning. The app *Roots to Words* provides several focused tasks for learners to explicitly learn the meanings of word roots, build up new words by using various morphemes, and practice morphological knowledge through engaging games. Word roots are divided into fifteen categories to facilitate learning (e.g., numbers, quantity, shapes). This app helps students understand how words are made up of root(s) as well as significantly increase the foundational knowledge of English word roots. Based on specific student need and learning objectives, teachers might use the apps in classroom to teach word roots of various categories or to increase students' awareness of metacognitive morphological knowledge in English through engaging individualized practices outside of classroom.

These apps are excellent for English as a foreign language learners to systematically evaluate and increase their morphological knowledge about most of the common American English words to prepare vocabulary for tests such as the TOEFL (Test of English as a Foreign Language) or GRE (Graduate Record Examinations). These apps can also be used by K-12 teachers in the classroom to instruct and evaluate morphological knowledge of English learners at different proficiency levels.

Besides the three apps mentioned above, we emphasize on intentional vocabulary learning through morphological analysis by using a dictionary source, such as the three dictionary apps discussed above (i.e., *Dicitionary.com*, *The Free Dictionary*, and *Merriam-Webster Dictionary*). We recommend learners to pay close attention to word origin or history when they look up unknown words through the dictionary apps. For instance, the origin of the word “zoology” comes from Greek to Latin (*Zoologia*) to English (zoo- + -logie/-logy). Further examination indicates that the morpheme zoo- means *living being or animal*. At this point, learners can break down the word, *zoology*, into two morphemes. This

knowledge of the internal structure of words allows students to understand new words that share the morpheme, for example, *zoologist* and *zoometry*. If students see an unfamiliar word (e.g., *zooplankton*) in reading context, they are likely to guess this word has something to do with the word root *zoo-*. To sum up, the merit of emphasizing word origins is that learning word roots will not only enlarge the breadth of vocabulary size but also the depth of vocabulary knowledge (Graves, 2009; Nagy & Scott, 2001).

With metacognitive morphological knowledge, English learners can learn unknown or unfamiliar words that are morphologically complex by using the strategy of morphological analysis while reading through various apps (e.g., *USA TODAY*, *NPR News*, *iBooks*, and *Kindle*). These apps provide a large amount of authentic reading contexts for English learners to enlarge their content knowledge (Klopfer & Squire, 2005). In addition, English learners are likely to pick up new vocabulary and technical terms that are morphologically complex, which becomes an incidental by-product because learners' primary objective is to read (Laufer, 2003; Shu, Anderson, & Zhang, 1995).

Contextual Analysis

Students use context clues to understand word meanings by scrutinizing surrounding text, including preceding or succeeding phrases and sentences that provide syntactic and semantic cues (Nagy & Scott, 2001). Contextual analysis is not always effective in the natural reading context in the short run. Some researchers (Nagy et al., 1987; Nagy & Scott, 2001; Schatz & Baldwin, 1986) pointed out that it is rare to learn a low-frequency word from a single encounter in a natural occurring context. Nevertheless, the use of context clues has been shown to improve learners' ability to infer vocabulary meanings of uninstructed words and performance in reading comprehension (Nagy & Scott, 2001). Contextual analysis helps vocabulary learning in reading (Nagy & Scott, 2001), especially when students are

exposed to a considerable amount of written texts, as what commonly happens in college (Nagy et al., 2006; Nist & Olejnik, 1995). The types of common context clues include: 1) a direct definition of an unfamiliar word provided by author, 2) an appositive definition of an unfamiliar word where the new word is defined by a word or phrase that comes before the new word, 3) synonym or antonym of an unfamiliar word, 4) examples of an unfamiliar word, and 5) nonspecific clues to the meaning of an unfamiliar word that often spread over several sentences (Diamond, & Gutlohn, 2006).

Mobile Apps for Contextual Analysis

We discuss a sample of three apps (e.g., *USA TODAY*, *NPR News*, and *Kindle*) that can assist practicing vocabulary learning through contextual analysis. The app *USA TODAY* provides the latest news in a simple and clear interface with the option of “list” or “grid” headlines view. It features eight topics such as latest news in various content areas with a weather forecast grid, sports news and scores, latest technology updates, and travel information. What’s more, it allows users to customize the panel to fit their interests and save stories for later access. The app *NPR News* presents a mix of audio, text, and images, which provides broad and timely content through various programs such as Arts & Life, All Things Considered, and Fresh Air. For these two apps, language learners can read or listen to hundreds of authentic and informative stories. Whenever language learners see unfamiliar words, they could focus on the text and detect context clues for possible meanings. An example sentence is “After a week at CES – I’m totally ragged. Twenty-hour work days, combined with Las Vegas – and I look and feel like I’ve aged about ten years” (Jolly, 2014). If a reader does not know the word “ragged”, the reader can examine closely the preceding and following sentences indicating its definition and explanation and, probably, will guess the word “ragged” might mean “very tired” or “worn out” (Diamond & Gutlohn, 2006).

The app *Kindle* affords an easy-to-use interface for reading books. Users have access to over a million books in the *Kindle* store plus hundreds

of newspapers and magazines, through which they can get certain free books or free samples. Amazon automatically syncs the last activity of users, so that users can pick up the reading where they left off on any linked device. Users can customize their own reading experience by choosing margin size, line spacing, background color, font size and style, and portrait or landscape format. When language learners read, they can easily highlight a word for definition through dictionary; they can revisit a different chapter or section by using the “go to” function. After reading, they can use the Notebook to review bookmarks, highlights, and notes. When reading, if a new or unfamiliar word influences learners’ comprehension, they can use context clues to guess the word’s function or meaning. If learners decide an unfamiliar word is important for learning, they can even highlight the new word or the sentence(s) that include this word. When the contextual sentence(s) are crucial for understanding the word, it is useful for learners to highlight the sentence(s) and, later, review the word that is embedded in the sentence(s).

Conclusion

The primary impetus for this article has been our observation that, although existing research shows much evidence that the use of mobile devices (especially iPads) has been increasingly used in educational settings and was found prominent to help users to become more effective learners, new apps often bring uncertainty to students and teachers of English learners as to how to use it to support language development. As Blanchard and Farstrup (2011) observed, teachers are struggling to keep pace with the speed of technological development and demand. Nevertheless, learners and educators should endeavor to explore and integrate new technology into teaching and learning, rather than sitting on the sidelines and watching as educational technology changes. We believe that the discussion of this article is beneficial for language learners and teachers to have a glimpse of the opportunities for vocabulary learning that comes with the affordances of the iPad and mobile technology in general.

Implications for Educators

Educators working with English learners are concerned with students acquiring vocabulary efficiently and quickly. The use of mobile devices that are often already in the hands of students can foster deep and individualized vocabulary learning that attends to surface and strategic approaches to increasing students' active lexicon. The affordances of mobile devices and the apps that can be used on them are not automatic. For students to maximize the affordances, educators must understand the theories and guidelines in content knowledge, the affordances of apps on mobile devices, and how to guide students through ways to actively engage in learning. Educators must start with modeling effective use of the apps and the metacognition that must occur for the learning to transfer beyond the classroom and beyond the specific words learnt.

References

- Baddeley, A. D. (1986). *Working memory. Oxford psychology series*. Oxford, UK: Clarendon Press.
- Baddeley, A., Gathercole, S., & Papagno, C. (1998). The phonological loop as a language learning device. *Psychological Review*, *150*, 158-173.
- Blanchard, J. S., & Farstrup, A. E. (2011). Technologies, digital media, and reading instruction. In S. J. Samuels & A. E. Farstrup (Eds.), *What research has to say about reading instruction* (4th ed.; pp. 286-314). Newark, DE: International Reading Association.
- Carlisle, J. F. (1995). Morphological awareness and early reading achievement. In L. B. Feldman (Ed.), *Morphological aspects of language processing* (pp. 189-209). Hillsdale, NJ: Erlbaum.
- Clark, M. (2013). *The use of technology to support vocabulary development of English Language Learners* (Master's thesis). Retrieved from http://fisher-pub.sjfc.edu/education_ETD_masters/238
- Coxhead, A. (2000). A new academic word list. *TESOL Quarterly*, *34*, 213-238.
- De Jong, P. F., Seveke, M. J., & van Veen, M. (2000). Phonological sensitivity and the acquisition of new words in children. *Journal of Experimental Child Psychology*, *76*, 275-301.

- Diamond, L., & Gutlohn, L. (2006). *Vocabulary handbook*. Berkeley, CA: Brookes.
- Francis, M. A., & Simpson, M. L. (2009). Vocabulary development. In R. F. Flippo & D. C. Caverly (Eds.), *Handbook of college reading and study strategy research* (2nd ed., pp. 97-120). New York, NY: Taylor & Francis.
- Gibson, J. J. (1977). The theory of affordances. In R. Shaw & J. Bransford (Eds.), *Perceiving, acting, and knowing: Toward an ecological psychology* (pp. 67-82). Hillsdale, NJ: Erlbaum.
- Gonzalez, O., & Gonzales, O. (1999). Building vocabulary: Dictionary consultation and the ESL student. *Journal of Adolescent & Adult Literacy*, 43, 264-270.
- Goodwin, A. P., & Ahn, S. (2010). A meta-analysis of morphological interventions: Effects on literacy achievement of children with literacy difficulties. *Annals of Dyslexia*, 60, 183-208.
- Graves, M. F. (2009). *Essential readings on vocabulary instruction*. Newark, DE: International Reading Association.
- Hairrell, A., Rupley, W., & Simmons, D. (2011). The state of vocabulary research. *Literacy Research and Instruction*, 50, 253-271.
- Harmon, J. (2012). Unlock literacy with iPads. *Learning and Leading with Technology*, 39, 30-31.
- Hirsh, D., & Nation, P. (1992). What vocabulary size is needed to read unsimplified texts for pleasure? *Reading in a Foreign Language*, 8, 689-689.
- Hulstijn, J. H. (2001). Intentional and incidental second language vocabulary learning: A reappraisal of elaboration, rehearsal and automaticity. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 258-286). Cambridge, UK: Cambridge University Press.
- Hockly, N. (2013). Mobile learning. *ELT Journal*, 67, 80-84.
- Jian, H. L., Sandnes, F. E., Law, K. M., Huang, Y. P., & Huang, Y. M. (2009). The role of electronic pocket dictionaries as an English learning tool among Chinese students. *Journal of Computer Assisted Learning*, 25, 503-514.
- Jolly, J. (2014, January 12). CES 2014: Get beautiful with these new gadgets. *USA TODAY*. Retrieved from <http://www.usatoday.com/story/tech/personal/2014/01/12/ces-2014-tech-beauty-gadgets/4438871/>.
- Kieffer, M. J., & Box, C. D. (2013). Derivational morphological awareness, academic vocabulary, and reading comprehension in linguistically diverse sixth graders. *Learning and Individual Differences*, 24, 168-175.

- Kieffer, M. J., & Lesaux, N. K. (2012). Knowledge of words, knowledge about words: Dimensions of vocabulary in first and second language learners in sixth grade. *Reading and Writing, 25*, 347-373.
- Kinash, S., Brand, J., & Mathew, T. (2012). Challenging mobile learning discourse through research: Student perceptions of Blackboard Mobile Learn and iPads. *Australasian journal of educational technology, 28*, 639-655.
- Klopfer, E., & Squire, K. (2008). Environmental Detectives—the development of an augmented reality platform for environmental simulations. *Educational Technology Research and Development, 56*, 203-228.
- Laufer, B. (2003). Vocabulary acquisition in a second language: Do learners really acquire most vocabulary by reading? Some empirical evidence. *Canadian Modern Language Review, 59*, 567-587.
- Laufer, B. (2005). Focus on form in second language vocabulary learning. *EUROSLA Yearbook, 5*, 223-250.
- Lys, F. (2013). The development of advanced learner oral proficiency using iPads. *Language Learning & Technology, 17*, 94-116.
- Macaro, E. (2005). *Teaching and learning a second language: A guide to recent research and its applications*. New York, NY: Continuum.
- McClanahan, B., Williams, K., Kennedy, E., & Tate, S. (2012). A breakthrough for Josh: How use of an iPad facilitated reading improvement. *TechTrends, 56*, 20-28.
- Nagy, W. E., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly, 19*(3), 304-330.
- Nagy, W. E., Berninger, V. W., & Abbott, R. D. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students. *Journal of Educational Psychology, 98*, 134-147.
- Nagy, W. E., & Herman, P. A. (1987). Breadth and depth of vocabulary knowledge: Implications for acquisition and instruction. In M. G. McKeown & M. E. Curtis (Eds.), *The nature of vocabulary acquisition* (pp. 19-35). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Nagy, W. E., & Scott, J. A. (2001). Vocabulary processes. In M. L. Kamil, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 269-284). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Nation, I. S. P. (2001). *Learning vocabulary in another language*. Cambridge, UK: Cambridge University Press.
- Nesi, H., & Haill, R. (2002). A study of dictionary use by international students at a British university. *International Journal of Lexicography, 15*, 277-305.

- Nist, S. L., & Olejnik, S. (1995). The role of context and dictionary definitions on varying levels of word knowledge. *Reading Research Quarterly, 30*(2), 172-193.
- Norman, D. A. (1988). *The psychology of everyday things*. New York, NY: Basic Books.
- Pure Oxygen Labs. (2013). How many apps are in each app store?. Retrieved from <http://www.Pureoxygenmobile.Com/how-many-apps-in-each-app-store/#sthash.Nn5og8lr.Dpuf> Accessed 05.06.13.
- Schatz, E. K., & Baldwin, R. S. (1986). Context clues are unreliable predictors of word meanings. *Reading Research Quarterly, 24*(1), 439-453.
- Schmidt, R. (1994). Deconstructing consciousness in search of useful definitions for applied linguistics. *Consciousness in Second Language Learning, 11*, 237-326.
- Schmitt, N. (2008). Review article: Instructed second language vocabulary learning. *Language Teaching Research, 12*, 329-363.
- Shu, H., Anderson, R. C., & Zhang, H. (1995). Incidental learning of word meanings while reading: A Chinese and American cross-cultural study. *Reading Research Quarterly, 30*(1), 76-95.
- Tong, X., Deacon, S. H., Kirby, J. R., Cain, K., & Parrila, R. (2011). Morphological awareness: A key to understanding poor reading comprehension in English. *Journal of Educational Psychology, 103*, 523-534.
- Walter, C. (2008). Phonology in second language reading: Not an optional extra. *TESOL Quarterly, 42*, 455-474.
- Wang, B. T., Teng, C. W., & Chen, H. T. (2015). Using iPad to facilitate English vocabulary learning. *International Journal of Information and Education Technology, 5*, 100-104.