

An Introduction to a New Taxonomy of Apps for Vocabulary Learning

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Abstract: With the rapid development of science and technology, the availability and popularity of technology-enhanced learning is increasing in recent decades especially in the fields like m-Learning, MALL (Mobile-Assisted Language Learning), CALL (Computer-Assisted Language Learning) etc. Lots of previous studies have researched how do high-tech devices (like smartphones, tablets etc.) and mobile apps facilitate learners' language learning. However, very little has been published on the features of the mobile apps for vocabulary learning and lacking a well-developed framework and taxonomy of the mobile apps for vocabulary learning. Therefore, the present research reviews the previous studies on language learning apps and codes the vocabulary learning apps available on the market aiming to figure out what kinds of features do these apps possess and provide a taxonomy of the features of these apps. The article also presents a framework for viewing the features of these apps from two different dimensions (app features focusing on different aspects of word knowledge and app features focusing on the functions of the apps). In the end, the article implies the direction for future research.

Keywords: Taxonomy, apps, vocabulary learning, technology-enhanced language learning

1. Introduction

Vocabulary is of great significance in learners' second language learning. From the linguistics' perspective, vocabulary is the most basic component of language expression and use. Just as the well-known linguist David Wilkins (1972) pointed out in his book *Linguistics in language teaching*: "Without vocabulary, nothing can be conveyed", vocabulary is the cornerstone laid for our use of language in the way we want to. From the language learners' perspective, vocabulary plays a fundamental but indispensable role in learners' second language learning. Since enlarging vocabulary size is the pre-requisite to improve learners' four language skills (i.e. listening, speaking, reading and writing skills), enlarging vocabulary size could improve learners' overall language proficiency. From the researchers' perspective, vocabulary is at the core of language learning and teaching. In decades, large amount of academic research centered on vocabulary learning varying from which words should be prioritized to learn to what kinds of word knowledge should be acquired, from how to learn vocabulary in an economic way to which strategies are efficient in terms of vocabulary learning. These large amounts of studies not only provide important knowledge of vocabulary learning, but also emphasize the important status of it in learners' successful language learning.

With the rapid development of economy in recent decades, science and technology has dramatically improved the convenience of people's lives. The widespread use of high-tech devices (like mobile phones, tablets etc.) in language learning is growing very fast and of great promise (Burston, 2014; Godwin-Jones, 2011; Kim & Kwon, 2012; Lys, 2013 etc.) especially in the fields like Mobile-Assisted Language Learning (MALL), Computer-Assisted Language Learning (CALL) etc.. Software applications (mobile apps) specialized in language learning is another important stream in technology-enhanced language learning, which could usually be downloaded and installed from the app stores either for free or commercially available. Although the use of high-tech devices and mobile apps for language learning is widely welcomed by learners due to its evident advantages, it received criticisms as well. Take mobile apps as an example. Some believed it is only a sort of replication of the language-learning activities already done by other technologies (e.g. Burston,

2014). Others pointed out the lack of opportunities for learners to participate in collaborative learning activities (Kim & Kwon, 2012). However, no one could deny the great flexibility, availability, portability, personalization and convenience it brings to language learners in the new era.

Due to the significance of vocabulary towards language learning, with the rapid development of Computer Assisted Language Learning, Computer Assisted Vocabulary Learning sprang up as well. Numerous research have been conducted in this area. Some compared vocabulary learning in the CALL ways with the traditional ways (e.g. Hirschel & Fritz, 2013; Hubbard, Coady, Graney, Mokhtari & Magoto, 1986; Zapata & Sagarra, 2007 etc.). Some explored learners' learning preference between using mobile phones and PCs (e.g. Stockwell, 2007 etc.). Some explored its advantages through analyzing the features reflected in the studies (Coll, 2002; deHaan, Reed & Kuwanda, 2010; Fox, 1984; Groot, 2000; Palmberg, 1988 etc.). Despite lots of research have studied technology-enhanced language learning and Computer-Assisted Vocabulary Learning, studies focusing on mobile apps for vocabulary learning are very few in number. Thus, the present research aims to:

- 1). explore what kinds of features these vocabulary learning apps possess;
- 2). offer a taxonomy of the features of these apps and a framework for viewing their features.

2. Literature Review

2.1 Different Aspects of Word Knowledge

In order to learn the vocabulary of a second language successfully, first of all, it is necessary for us to clarify what aspects of word knowledge are necessary to learn in terms of knowing a word. According to Nation (2001), in general, knowing a word at least involves three main aspects: 1). Form (which includes spoken, written and word parts); 2). Meaning (which includes form and meaning, concept and referents and associations); 3). Use (which includes grammatical functions, collocations and constraints on use such as register, frequency etc.). Further, each minor category in the bracket could be sub-classified in terms of two dimensions: receptive and productive. Thus, in total, 18 specific aspects of knowledge are included in what is involved in knowing a word. Nation believed that different kinds of knowledge require different kinds of learning (i.e. explicit learning & implicit learning), further, different kinds of learning require different kinds of learning activities (Nation, 2001).

2.2 Vocabulary Learning Strategies (VLS)

2.2.1 Paper Title

Lots of scholars have conducted research on vocabulary learning strategies throughout years; however, the taxonomy of vocabulary learning strategies varies from one researcher to another. Schmitt (1997) classified all vocabulary learning strategies into two main categories: 1). Discovery Strategies (i.e. strategies for the discovery of a new word's meaning) which include two subcategories: Determination and Social Strategies. 2). Consolidation Strategies (i.e. strategies for consolidating a word once it has been encountered) which include four subcategories: Social, Memory, Cognitive and Meta-cognitive Strategies. Zhang and Li (2011) designed three dimensions (cognitive, meta-cognitive and affective) consisting of six categories in total through conducting a factor analysis. Nation (2001) developed a taxonomy of vocabulary learning strategies, which divided the whole into four general classes: 1). Planning: choosing what to focus on and when to focus on it; 2). Sources: finding information about words; 3). Processes: establishing knowledge; 4). Skill in use: enriching knowledge. Each general class was further sub-divided into several minor types. Gu & Johnson (1996) classified all vocabulary learning strategies into eight dimensions and categories which include beliefs about vocabulary learning, meta-cognitive regulation, guessing strategies, dictionary strategies, dictionary strategies, note-taking strategies, rehearsal strategies,

encoding strategies and activation strategies. As we can see, the taxonomy of vocabulary learning strategies varies when being considered from different dimensions as well as perspectives.

2.2.2 The Choice of VLS & Vocabulary Learning Outcomes

Previous studies have demonstrated that compared with others, some learning strategies are more effective in terms of vocabulary acquisition (Wang, 2013) and are more likely to bring learners' language proficiency to higher levels (Carrier, 2003; Ikeda & Takeuchi, 2003; Macaro, 2001; Cohen, Weaver, & Li (1996); Nakatani, 2005; Rost & Ross, 1991; Vandergrift, 2003 etc.). Thus, accordingly, these strategies should be made fuller use of by language learners during their vocabulary learning. In 2005 and 2012, Intaraprasert's research together with Rezvani, Kalajahi and Pourshahian's research found that one particular vocabulary learning strategy cannot significantly influence learners' vocabulary knowledge. Whereas a combination of a variety of strategies could effectively build up learners' vocabulary knowledge (Ahmed, 1989; Gu, 1994; Sanaoui, 1995 etc.). Further, studies also found that different sets of combination would ultimately lead to different kinds of vocabulary learning outcomes and the more well-balanced and integrated the combination of vocabulary learning strategies are, learners are more likely to produce ideal vocabulary learning outcomes (Gu & Johnson, 1996). When learners choose different kinds of vocabulary learning apps, they actually unconsciously choose different combinations of vocabulary learning strategies (which are decided by the features possessed by their chosen apps) at the same time and thus would finally get different vocabulary learning outcomes correspondingly. Thus, it is necessary for researchers to figure out the features of these vocabulary learning apps in order to facilitate learners' vocabulary learning in an effective way.

3. Methodology and Results

In this study, we first reviewed previous studies on apps for language learning and distinguished all the related features of apps for vocabulary learning. Then, we classified these vocabulary learning app features into different categories based on Rosell-Aguilar's (2017) taxonomy of mobile apps for language learning and Nation's (2001) different aspects of word knowledge. As a result, we got a preliminary taxonomy of apps for vocabulary learning. Then, we codes the apps for vocabulary learning available on the market to test whether our taxonomy could contain all the features these vocabulary learning apps possess and at the same time, we kept refining our taxonomy and framework for vocabulary learning apps at hand. Finally, we obtain a new taxonomy and framework for vocabulary learning apps as follows (please see Table 1 and Table 2):

Table 1

App features focusing on different aspects of word knowledge

Word knowledge aspects	App features	Definitions (the working definition for the purpose of this study)
Form	Pronunciation	Pronunciation is defined as the symbols aiming to instruct language learners to pronounce the word in a standard way, which includes items like the phonetic symbol (e.g. the syllable), tone, stress etc.
	Orthography	Orthography refers to the writing system aiming to instruct language learners to write the word in a standard way, which includes items like the strokes, the alphabetic letters etc.
	Word parts (affixes,	Affixes refer to the parts of the word which could only be used when being added

	stems etc.)	<p>onto another morpheme (i.e. another root or stem) of the word, which typically includes three types: prefixes (at the beginning of the word); suffixes (at the end of the word), infix (in the middle of the word) (Hu & Liu, 2001).</p> <p>Stems refer to one morpheme or combination of morphemes which an affix can be added onto (Hu & Liu, 2001).</p>
Meaning	Word meaning	Word meaning refers to the explanation of the meaning of the word.
	Associate words (synonyms, antonyms etc.)	<p>Synonyms refer to words that have the same or close meaning of the target word (Hu & Liu, 2001).</p> <p>Antonyms refer to words that have the opposite meaning of the target word (Hu & Liu, 2001).</p>
	Grammatical use (number, gender etc.)	<p>Number refers to the grammatical category which could help to analyze whether the word is singular, dual or plural. (Hu & Liu, 2001).</p> <p>Gender refers to the grammatical category which could help to analyze whether the word is “masculine, feminine or neuter”, “animate or inanimate”, etc. (Hu & Liu, 2001).</p>
	Idiom	Idiom refers to the phrasal expression which is used as one unit either semantically or syntactically functioning like one word (Hu & Liu, 2001).
	Collocation	Collocation refers to the co-occurrences of certain particular words which are often used together (Hu & Liu, 2001).
	Occurring context	<p>Register refers to the situation where the word should be used, which is closely related to the following issues between the user and the receiver: (1) their experience; (2) their relationships; (3) communication medium (Hu & Liu, 2001).</p> <p>Frequency refers to the situation where the word is most or least often used by people in certain situations.</p> <p>Cultural information indicates whether this word correlates with or carry any culture factors (like local customs, traditions etc.).</p> <p>Language varieties refers to the variants of the language which deviate from the standard ones caused by regional or national factors.</p>

Table 2

App features focusing on the functions of the apps

Functions	Definitions
Way of presentation	Way of presentation refers to the multimedia identification of the presentation of the word, which includes sound, images, graphs, videos etc.).
Assessment	Assessment refers to whether the app includes the function of assessing the learners' achievements towards learning the word.
Record of learning progress	Record of learning progress refers to whether the app includes the function of recording the learning progress of the learners.
Personalization	Personalization refers to the personalized design of the apps for 1). User experience; 2). Learning difficulty (Vygotsky, 1987); 3). Vocabulary types.
Engagement	Engagement refers to whether the apps could let learner's motivated.
Interaction	Interaction refers to whether the apps provide learners with an environment which allows them to interact with the app or with each other.
Sharing	Sharing refers to whether the apps allow learners to share learning content with others on social media.
Gamification	Gamification refers to whether the apps have game features.
Offline work	Offline work refers to whether the apps could still work without internet connection.

As you can see, the whole taxonomy is classified into two main categories from two different dimensions: 1). App features focusing on different aspects of word knowledge and 2). App features focusing on the functions of the apps. The first main category is further sub-divided into 10 minor categories in terms of Nation's (2001) aspects of word knowledge. Whereas the second main category is classified into nine minor ones in terms of various functions of the apps. The rightmost column of the above two tables also provides the working definition of each specific category of the taxonomy as well.

4. Conclusion and Future Research

In summary, this research provides a new taxonomy and framework for apps for vocabulary learning based on previous related studies and research on language learning apps as well as the reviewing of the features of the available vocabulary learning apps on the market. Due to the fast development of science and technology of the current era, it is not easy to predict the direction of the future research. However, a proposal for putting this taxonomy and framework into practice to test its feasibility might be a potential direction for future research.

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