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The Vocabulary Research Database: A Compilation of State-of-the-Art Academic Vocabulary Research

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ABSTRACT

The Vocabulary Research Database: A Compilation of
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The Vocabulary Research Database (VRD is a research tool comprised of a compilation of state-of-the art academic research in the field of vocabulary acquisition and pedagogy. The VRD has flexible search features that allow users to obtain higher granularity than is possible with other free databases and online search options currently available, making the results more relevant and manageable. These features include the ability to constrain results by date, author, publication, sub-topics, keywords, citation numbers, journal impact factors, and participant ages. It is anticipated that the ability to manipulate results, combined with relevant and current content, will provide language professionals with a valuable tool for accessing vocabulary-specific research, enabling them to better inform and improve their work.

Keywords: vocabulary, database, search, state-of-the-art, academic research

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Chapter One: Introduction

Vocabulary study has been part of language learning and recorded language research for many centuries (Laufer, 2009; Schmitt, 2000). However, the degree of importance accorded to vocabulary study has fluctuated over time, depending on the approach to language learning currently in vogue (Brown, 2001; Laufer, 2009; Zimmerman, 1997). In 1980, Meara described vocabulary research as a neglected area in the field of applied linguistics. His article summarized the work being done in vocabulary research and psycholinguistics at the time and went on to pose questions he felt would be worth investigating in the future. He also pointed out the need for a more systematic approach to vocabulary research. Meara's publication signaled a reawakening in the field of applied linguistics to the importance of studying vocabulary acquisition and the subsequent pedagogical implications. Words used to describe the amount of research conducted since 1980 include "mini-explosion" (Folse, 2004) and "vast" (Laufer, 2009). In a profession that concerns itself with the nature and meaning of words, these descriptions carry significant weight. There is an immense amount of research, and the need to make it easily accessible and therefore useful is the impetus for this thesis.

Roughly coinciding with Meara's 1980 publication was the development of Second Language Acquisition (SLA) from its interdisciplinary roots to a unique field of study (Laufer, 2009). SLA researchers have a shared interest in vocabulary-specific topics, such as the sources of language knowledge, the nature and role of input, and the effectiveness of communicative tasks, which prompted the integration of vocabulary study into mainstream SLA research (Laufer, 2009). The timing of this integration proved to be fortuitous as well, with the development of new technologies fueling progress in corpus linguistics, computer-aided language learning (CALL), and online learning (Gardner, 2013b; Sinclair, 2004). All of these

factors contributed to the profusion of new research described above, which has generated new insights into how language is both used and acquired, as well as provided further questions for study.

In addition to the importance of studying language itself, studies confirming the connection between language facility and other life dynamics such as educational success and adequate employment have heightened the relevance of language research and instruction (Gardner, 2013a; Goldenberg, 2008; Hirsch, 2013; Neuman & Dwyer, 2011; Sohr-Preston, et al., 2013). Drawing a direct line between K-12 academic success, gateway exams such as the SAT and ACT, college admission and completion, and subsequent employment, Hirsch (2013) states that vocabulary size may be used as a proxy measure for a wide range of attainments and abilities. The links between vocabulary, language development, academic success, and employment make vocabulary research and effective pedagogy increasingly important in a global economy where language skills are often directly related to quality of life.

The issue of vocabulary competence is especially relevant for English language learners (ELLs), as they must master the same advanced academic vocabulary as their native-English speaking peers while simultaneously acquiring basic communication skills in a second language. Gardner (2013a) highlights the reality that ELLs do not have time to acquire vocabulary naturally over long periods of exposure, and that an inability to expedite vocabulary learning can have "profound consequences for many learners of English who must attain high levels of proficiency in the language in order to compete in academic and occupational settings" (p. 3). In the case of ELLs, effective and efficient vocabulary instruction is crucial.

This thesis is an attempt to support the critical role that vocabulary acquisition plays in language education and research by creating a freely available searchable database, hereafter

referred to as the Vocabulary Research Database (VRD). The VRD is designed to provide researchers, experienced teachers, and teachers in training with organized access to state-of-the-art research on vocabulary topics. The current iteration covers the years 2000-2014, with plans in progress for continued updating. Previous efforts to create vocabulary databases include Waring's downloadable collection of vocabulary research and Meara's Vocabulary Acquisition Research Group Archive (VARGA). Both of these resources offer valuable information and have differing strengths and weaknesses. Their existence also demonstrates a recognized need for vocabulary research to be concentrated into an accessible and searchable format beyond the more general online search options such as Google Scholar.

The VRD is a valuable extension of these previous efforts. It offers tools and features that will enable users to find information with greater acuity than is currently available, including the ability to organize the information through topical (sub-topics, keywords) and non-topical (citation numbers, publication date) methods. It is anticipated that the flexibility and precision of the VRD will help to make the vast body of vocabulary research more approachable, manageable, and accessible to researchers and educators who are seeking to use current data to inform and improve their work.

Chapter Two: Literature Review

Language teaching and research often demonstrates a cyclic nature, with the methodological pendulum swinging between points such as grammar and translation to reading to oral language and back again (Brown, 2001). This cyclic course is not solely determined by linguistic concerns but is also influenced by political, geographic, and even economic realities. Bernhardt (1998) notes a gap in the collective understanding of language professionals regarding these outside influences, stating that "older as well as newer members of our profession are unfamiliar with the basic chronology of major landmarks in American language teaching…. It is a bitter irony in our profession that *context* is an important word, and yet our own context seems to be foreign to us" (p. 40, emphasis in original). Her statement describes a perceived general lack of awareness by language professionals of the history of their profession and implies that this unawareness partly contributes to the cyclic tendencies of language teaching. While professional trends are driven by a complex mix of factors, Berhnardt's statement highlights the idea that understanding the evolution of language teaching is an important part of avoiding redundancy and repeating ineffective strategies of the past.

Within the language profession, the importance of vocabulary has also fluctuated over time, it likewise being subject to historical context. The Vocabulary Research Database (VRD) is an effort to connect teachers and researchers to the current context of vocabulary research, with an emphasis on state-of-the-art information in a format that enables them to navigate the complicated world of vocabulary research in a simple and effective manner. It is anticipated that facilitating access to current research will provide an enhanced perspective on the state of modern vocabulary study and will also enable users to trace the historical paths that have led to the present landscape.

Historical Overview

The use of a symbolic language system is a uniquely human characteristic, enabling both concrete and abstract communication among people who share the same language (Ortega, 2009). While the acquisition of a first language is almost universally completed within the first six years of life (barring health, environmental, or psychological difficulties), it is also a common reality across the globe for individuals to learn one or more additional languages later in life as needed or desired (Wiley, Garcia, Danzig, & Stigler, 2014). The acquisition of a second language is a complex process involving a multitude of varying factors. The scholarly study of this process first began to emerge in the 1960s as Second Language Acquisition (SLA), a new field of study woven from the existing research threads of language teaching, linguistics, child language acquisition, and psychology, and has over time also developed ties with other fields such as psycholinguistics, education, anthropology, and sociology (Ortega, 2009).

Although SLA is a relatively new field of study, the recorded history of second language learning extends back in time to at least the second century B.C., where historical records describe Roman children studying Greek (Schmitt, 2000). Through the centuries, language teaching evolved through various periods of differing emphasis as the successes and failures of various approaches became apparent. In 1611, William of Bath published a text rebelling against the prior Latin-based focus on grammar, preferring instead to present common Latin vocabulary in context using proverbs (Schmitt, 2000). He also suggested an inductive approach to language teaching based on a specific quantity of basic vocabulary, which generated the concept of creating a core vocabulary for language learners that would later be developed as part of the Vocabulary Control Movement in the early twentieth century.

During the eighteenth and nineteenth centuries, prescriptive Latin grammar instruction remained the dominant approach, specifically the Grammar Translation Method. Under this method, language students practiced translating passages of Latin and Greek, studying archaic structures and a wide range of literary vocabulary that was usually selected to illustrate a grammatical point and was often obsolete (Zimmerman, 1997). This era also saw the publication of early dictionaries, which began to standardize vocabulary, spelling, pronunciation, and lexical use (Schmitt, 2000). By the end of the nineteenth century, other teaching methods had evolved that challenged the dominance of grammar-based instruction and placed greater emphasis on oral language and improving students' ability to communicate, the most prominent being the Direct Method. The Direct Method focused on acquiring language through oral exposure to the target language and assumed vocabulary would be acquired incidentally, much as it is with first language (L1) acquisition (Brown, 2001; Zimmerman, 1997). However, the difficulty of finding teachers who were fluent in target languages, along with the influence of the Coleman Report in 1929 (which cast doubt on the efficacy of oral language teaching), reprioritized reading as the primary medium for language learning in the 1930s (Bernhardt, 1998; Brown, 2001).

Throughout the twentieth century, language-learning methods evolved rapidly, spurred in part by global conflicts and the need to learn foreign languages quickly and effectively. For example, during World War II behavioral specialists developed intensive language courses that came to be known as the Army Specialists' Training Program (or "Army Method," later dubbed the Audiolingual Method), which focused on oral drills, pattern repetition, and memorization (Brown, 2001). Language learning under this approach was viewed primarily in terms of habit formation according to principles of behaviorist conditioning and intensive oral practice.

In a separate area of focus during the same era, West published *A General Service List of English Words* (GSL) in 1953, which culminated several decades' worth of effort by Vocabulary Control researchers to develop a core list of frequent, useful vocabulary (Schmitt, 2000). The GSL is a list of 2,000 headwords that were considered to be most useful to English language learners and served as a reference for several decades (Brezina & Gablasova, 2013). However, learning vocabulary through lists was deemed potentially distracting according to the Audiolingual Method (Schmitt, 2000), which put the two approaches at odds with each other.

Shortly after the publication of the GSL, Chomsky published his work introducing the idea of Universal Grammar in 1957, which undermined the behaviorist paradigm of the Audiolingual Method by presenting language learning as innate—the result of inherent, abstract rules rather than learned habits (Schmitt, 2000). Linguistic teaching then ricocheted from Chomsky's autonomous, hard-wired and grammar-based language model to Hymes's concept of communicative competence introduced in 1972, which emphasized the social and pragmatic features of language (Zimmerman, 1997). This last swing shifted the direction of language teaching toward communicative proficiency, and the idea of communicative competence became a dominant force that continues to shape current language teaching.

During the 1970s, several so-called "designer methods" developed under the umbrella of communicative language teaching, such as The Silent Way and Total Physical Response, with the pedagogical emphasis on vocabulary shifting accordingly (Brown, 2001). By 1980, Paul Meara stated that vocabulary acquisition as a focus of SLA had been "very largely neglected," (p. 221), indicating the lack of vocabulary-specific research conducted in the previous decades. Schmitt (2000) also cites this lack of emphasis on vocabulary, stating that "most [second language teaching] approaches did not really know how to handle vocabulary, with most relying

on bilingual word lists or hoping it would just be absorbed naturally" (p. 15). However, by the early 1980s the fields of language and vocabulary study were poised for exponential growth that would seek to further investigate and refine past efforts. Language corpora and the computer software necessary to analyze them became more powerful and widely available. Language researchers, spurred by the need to teach lexical and phraseological structures and the recognition that human intuition failed to produce these structures accurately, turned to corpora for authentic language data (Sinclair, 2004).

In addition to linguistic and pedagogical developments, the political and historical backdrop of language teaching in the United States had also evolved. Emerging from the Cold War and the economic distress of the 1970s, the U.S. faced the need to assimilate an increasing and linguistically diverse immigrant population, while politically conservative action groups like English Only sought to preserve English as the dominant language (Bernhardt, 1998). Offering foreign language education to the native English-speaking population at times competed with English second-language education for non-native English speakers for funds and primacy in the American education system, creating a complex web of linguistic, educational, and financial concerns.

It is within these ever-evolving dynamics of technological, political, economic, and educational realities that the profusion of language research in the past few decades has taken place. Vocabulary is now recognized as a primary need for all language learners (Folse, 2004), and the questions of *what* to teach and *how* to teach it continue to drive current research in the field of SLA.

The Surge of Research: Compilation and Access

The exponential increase in published vocabulary-related research articles and books over the past few decades has been noted by several researchers. Writing in 2002, Meara reviewed four substantial texts on vocabulary research and stated that it would have been impossible to review a similar set of books twenty years ago because books on vocabulary acquisition simply did not exist then. He states that Nation's 1990 book *Teaching and Learning Vocabulary* was "the first substantial text on second language vocabulary to appear for more than 50 years" (p. 394). Recalling both her intuitive response and personal observations regarding vocabulary-related research articles, Laufer (2009) wrote that even though she had felt that interest was growing in the late 1980s, she "did not envisage the vast quantities of lexical research that would [be] produced in the following two decades" (p. 341). It is particularly meaningful to read these insights from professionals who have worked in the vocabulary field for several decades and witnessed the research surge unfold.

Recognizing the need for teachers and researchers to have access to this information, two previous efforts have been made to organize available research into freely available online vocabulary-specific databases. These are the Waring file, available for download at http://www.robwaring.org/vocrefs/vocref.html, and the Vocabulary Acquisition Research Group Archive (VARGA), available online at http://www.lognostics.co.uk/varga/index.htm. The scope of the research surge, and an indication of how well these databases have accounted for it, can be seen in decade-by-decade number totals from each in Table 1. Search results on "vocabulary" from the subscription-based Linguistics/Language Behavior Abstracts (LLBA) have also been included as another point of general reference, with the acknowledgement that numeric results on one search term should not be considered comprehensive.

Table 1

Totals of Research Articles by Decade

Dates	LLBA	Waring	VARGA
1961-1970	31	1,086	94
1971-1980	3,422	4,694	285
1981-1990	3,944	8,074	633
1991-2000	5,693	11,987	1319
2001-2010	6,457		1399
2011-2014	3,199		426

Existing Resources

The Waring database and the VARGA, referenced earlier, are two independently created databases that currently offer differing degrees of language- or vocabulary-specific information. The Waring file contains basic reference information for over 32,000 research articles on SLA, with over 29,000 of them related in some way to vocabulary (Waring, 2003). The articles date back to 1640 and the collection ends in 2001. Those who want to use the file need to import it into their own database software (such as FileMaker, Excel, or EndNote) and organize the information into fields, which they can then search according to their own needs. One of the most significant assets of this collection is breadth and chronological range, with no other database offering the sheer quantity of information or reaching as far back in time. A downside of this incredible size is that it can be unwieldy and difficult to navigate. The information has not been tagged or organized in any way, but it is freely available to anyone who would like to use it.

A second database that is freely available online is the VARGA. This database allows users to search online without downloading any of the information, making it more convenient and accessible for those who do not have their own database software. The home page offers a keyword search box and the ability to constrain results by date, and users may also indicate whether they would like abstracts included (Figure 1). The earliest search date possible is 1915, making it less historically comprehensive than the Waring database. However, it is being updated on an ongoing basis and currently lists research published as late as 2014. Search results are listed in chronological order with the oldest first, and the results are listed alphabetically by author last name. This basic organizational structure allows users to navigate the results with relative ease. The option to include abstracts also provides users with information about the content of the research articles.

Figure 1. Screenshot of the VARGA website homepage, showing the search box, date constraint options, the option to include abstracts, and brief instructions.

As demonstrated by the numbers in Table 1, the VARGA database is less extensive than the Waring file. It specifically targets second-language vocabulary acquisition (Meara, 2015),

where the Waring database includes research on vocabulary, second language teaching, SLA, theoretical work, and teaching tips (Waring, 2003). There are no other tools available on the VARGA site other than search terms and dates, so users must sort through results and conduct new searches using different terms if the results do not provide the information desired. This can be somewhat tedious, especially when beginning the research process with more general terms. The abstracts included in the results are descriptions of the content rather than actual abstracts, and there are no hyperlinks to the content.

Beyond the realm of small, discipline-specific databases, there are free online search engines available for academic research, the most prominent being Google Scholar (GS). GS is designed to be comparable to other large commercial databases, such as Web of Knowledge by Thomson Reuters and Scopus by Elsevier. These commercial databases cover academic publishing in the sciences, social sciences, arts, and humanities, but are only available through subscription. Since the inception of GS in 2004, several studies have compared the content and features of GS with other commercial databases. In terms of content, Neuhaus et. al (2006) examined the coverage of GS compared to 47 other commercial databases. Mean category coverage scores ranged from 10% in the humanities to 41% in education to 76% in science and medicine. However, GS coverage seems to have improved over time, with Chen (2010) reporting approximately 98-100% coverage results among the databases GS is allowed to crawl. Chen states that there is unique content on websites that GS does not have access to, including trade journal articles, conference presentations, pamphlets, and content from ceased journals, but remains ambivalent about the potential value of these types of content.

Studies comparing GS to linguistics databases are not available yet; however, a recent discipline-specific study in geography (Stirbu, Thirion, Schmitz, Haesbroeck, & Greco, 2015)

compared GS to three other commercial databases in that field and found that "GS leads the other tools widely on a number of results, independently of keyword, subfield, year of publication, or time of search" (p. 322). Though GS performs well in terms of content, these researchers concede that there are disadvantages to GS, including "variable reference format and incorrect information regarding authors, journals, and citations…and the processing or sorting of results remains very time-consuming in GS, both due to the overall amount of data and to limited functionality" (p. 328). Similar disadvantages were noted by Aguillo (2012), who described GS as "a very noisy database that requires a lot of difficult and time consuming cleaning effort to obtain useable information" (p. 344).

The VRD is being designed to counteract the noise generated by automated databases based on web crawlers such as GS. There are advantages and disadvantages to a human-generated database. The human capacity for nuance and meaningful interpretation also introduces the possibility of subjectivity and error. Content will not be as comprehensive or as regularly updated as it is in an automated database. However, the content has the advantage of being connected to sub-topics and keywords in interpretive ways that might not be true of automated systems. It should be noted as well that the VRD is not intended to replace other tools but to work in concert with them according to user needs.

Returning to the domain of vocabulary-specific databases, the VRD functions as a valuable addition to the Waring database and the VARGA because of its capacity to offer search results in an organized, flexible, and manageable manner. Users will be able to simultaneously filter results according to multiple factors, enabling them to narrow or widen their search field as needed. Users can zoom in or out on results by layering the filters—adding filters restricts the results, while clearing the filters widens them. This flexibility in viewing and manipulating the

data is much more visually efficient than is possible in any other database or search engine. These filtering options also enable users to focus on the quality of search results as well as the quantity, which can make the results more useful and the searching process more efficient.

This capacity to find truly relevant search results sets the VRD apart from other options. Researchers can easily filter the content based on their area of interest, narrowing the results by topic, specific keywords, and even participant age group. They can also filter results by specific journals if they are interested in publishing, to see what types of research articles have recently been published in any given journal. Undergraduate and graduate students and researchers who are new to the field of vocabulary may filter the content according to citation numbers to see which articles have been most cited and are consequently most influential in the field. Educators may filter the results according to their areas of interest or age. Researchers concerned about scholarly quality may filter according to journal impact factors. Nearly all of the content in the VRD is hyperlinked to publisher sites so users can read the abstracts or full articles (for open access journals). All of these features were designed to give users the most information possible in a flexible format that enables them to easily manipulate the content.

The historically cyclic nature of language teaching and research has been demonstrated over centuries, but there has never been an age where access to previous research has been so readily available. The VRD is a potentially powerful tool for enhancing this access. Through finding, using, and understanding previous research, vocabulary professionals will be able to make increasingly informed decisions on how to best progress in the study and teaching of vocabulary, which will in turn improve not only the research and teaching processes, but also the lives of those who need quality language skills in order to succeed and thrive in the global village of the 21st century.

Chapter Three: Creating the Database

The Vocabulary Research Database (VRD) is being designed with several overarching principles in mind: state-of-the-art content, relevance to the fields of vocabulary instruction and research, ease of use, and manageability of search results. This section will outline the steps taken to ensure adherence to these principles.

Background

The concept of creating a modern, accessible database originated with Dr. Dee Gardner in response to recognizing the need for educators and researchers to have free access to the most recent vocabulary research available. This access would also need to be enhanced by effective organization and ease of use, with enough flexibility for users to target specific areas of interest with a high degree of granularity. Work on the database began with the help of two graduate assistants—Erin Shaw and Elena Shvidko, who started compiling references extracted from the Linguistics & Language Behavior Abstracts (LLBA) into an Excel document. In September of 2012, graduate student Emily Tuioti assumed primary responsibility for the project. She expanded the extraction sources to include references from vocabulary specialists' websites and further refined the process of searching academic journals. Tuioti's work included creating a list of nearly 100 search terms (see Appendix A) to use with the LLBA, identifying almost 20 journals to search individually, and a short list of journals that had yielded little information. She also outlined a process for exporting the citations to RefWorks (an online research management tool), and from RefWorks into the database Excel document. Excel filters were then applied in order to sort the citations by author names and dates and to remove duplicates. Due to the combined efforts of these three graduate students, over 2,200 articles were compiled in this early version of the database, covering the years 2001-2011.

Current Development: State-of-the-art Content and Additional Search Features

Building upon this previous work, the current developer assumed the primary role of updating the reference information, adding current content, and refining the features of the VRD in 2014, including adding sub-topics, keywords, citation numbers, journal impact factors (IFs), participant ages, and hyperlinks to journal abstracts or text. These updates make the VRD state-of-the-art in terms of content and organizational features. Previous entries were also edited for consistency in formatting and style, which helped to eliminate duplicate entries not previously identified.

The VRD is currently in the form of an Excel document and is available online through Google Documents or as downloadable file. The Excel format offers simple organization, with the information about each article or book organized in columns. Each column has a filtering option, and multiple filters may be used at the same time. This allows users to organize the content in many ways, and makes the VRD capable of significantly greater flexibility and specificity than other options currently available.

To understand the potential power of the filters in meeting specific needs, a few hypothetical cases may be considered. A teacher in training who is relatively new to the field of vocabulary may be interested in finding research that is considered to be influential by current vocabulary professionals. This teacher could sort the database using the sub-topic *instruction*, and then sort the citations column in descending order, with the highest numbers listed first (Figure 2). The database would then list the most-cited articles first, giving the user insight into which articles related to instruction are most significant. The user could further filter results by journal IFs, which would also give some indication of which publications carry the most

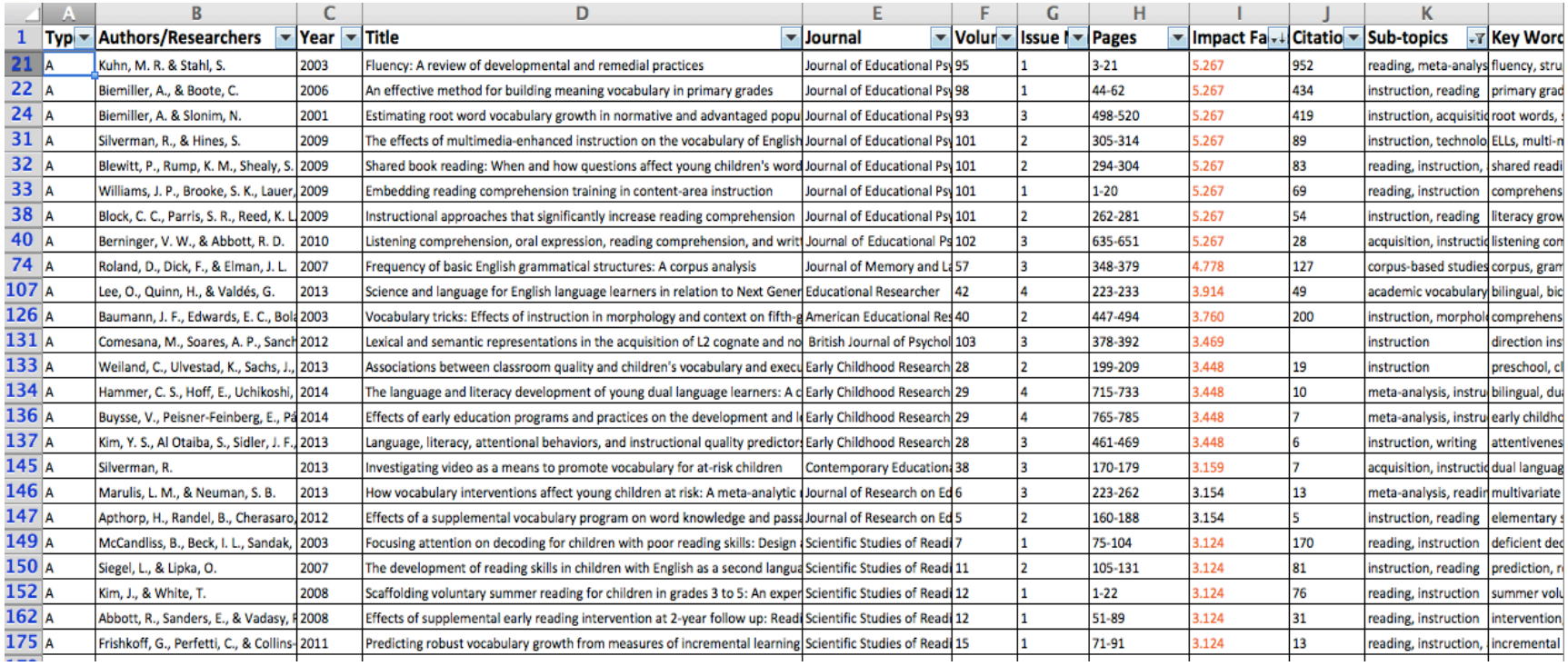
	A	B	C	D	E	F	G	H	I	J	K	
1	Typ	Authors/Researchers	Year	Title	Journal	Volur	Issue I	Pages	Impact Fa	Citatio	Sub-topics	Key Word
21	A	Kuhn, M. R. & Stahl, S.	2003	Fluency: A review of developmental and remedial practices	Journal of Educational Psy	95	1	3-21	5.267	952	reading, meta-analys	fluency, stru
22	A	Laufer, B., & Hulstijn, J.	2001	Incidental vocabulary acquisition in a second language: The construct of task	Applied Linguistics	22	1	1-26	2.524	868	acquisition, instructio	retention, ta
24	A	Carlo, M. S., August, D., McLaughli	2004	Closing the gap: Addressing the vocabulary needs of English-language learne	Reading Research Quarte	39	2	188-215	2.557	552	academic vocabulary	vocaulary ga
31	A	Hulstijn, J. H., & Laufer, B.	2001	Some empirical evidence for the Involvement Load Hypothesis in vocabulary	Language Learning	51	3	539-558	1.824	490	acquisition, instructio	retention, ta
32	A	Wray, A.	2000	Formulaic sequences in second language teaching: Principle and practice	Applied Linguistics	21	4	463-489	2.524	471	instruction, multi-wo	idioms, idion
33	A	August, D., Carlo, M., Dressler, C.,	2005	The critical role of vocabulary development for English language learners	Learning Disabilities Rese	20	1	50-57	0.73	460	meta-analysis, instru	ELLs, assessr
38	A	Biemiller, A., & Boote, C.	2006	An effective method for building meaning vocabulary in primary grades	Journal of Educational Psy	98	1	44-62	5.267	434	instruction, reading	primary grad
40	A	Biemiller, A. & Slonim, N.	2001	Estimating root word vocabulary growth in normative and advantaged popu	Journal of Educational Psy	93	3	498-520	5.267	419	instruction, acquisitio	root words,
74	A	Beck, I. L., & McKeown, M. G.	2001	Text talk: Capturing the benefits of read-aloud experiences for young childre	The Reading Teacher	55	1	10-20	0.678	402	reading, instruction	reading out l
107	A	Schmitt, N.	2008	Review article: Instructed second language vocabulary learning	Language Teaching Resea	12	3	329-364	1.140	369	instruction, acquisitio	depth of kno
126	A	Beck, I. L., & McKeown, M. G.	2007	Increasing young low income children's oral vocabulary repertoires through	Elementary School Journa	107	3	251-271	1.716	352	instruction	direct instru
131	A	Waring, R,. & Takaki, M.	2003	At what rate do learners learn and retain new vocabulary from reading a gra	Reading in Foreign Langua	15	2	130-163		324	reading, instruction	extensive re
133	A	Laufer, B.	2003	Vocabulary acquisition in a second language: Do learners really acquire most	Canadian Modern Langua	59	4	565-585		274	reading, instruction	task-basked
134	A	Grabe, W.	2004	Research on L2 teaching reading	Annual Review of Applied	24		44 69	1.270	231	reading, instruction,	instructional
136	A	Laufer, B., & Goldstein, Z.	2004	Testing vocabulary knowledge: Size, strength, and computer adaptiveness	Language Learning	54	3	399-436	1.824	224	assessment, technolo	vocabulary k
137	A	Nassaji, H.	2003	L2 vocabulary learning from context: Strategies, knowledge sources, and the	TESOL Quarterly	37	4	645-670	1.158	220	instruction, reading	lexical infere
145	A	Baumann, J. F., Edwards, E. C., Bola	2003	Vocabulary tricks: Effects of instruction in morphology and context on fifth-g	American Educational Res	40	2	447-494	3.760	200	instruction, morpholo	comprehens
146	A	Baumann, J. F., Edwards, E. C., Fon	2002	Teaching morphemic and contextual analysis to fifth-grade students	Reading Research Quarte	37	2	150-176	2.557	190	instruction, reading,	morphemic a
147	A	Webb, S.	2007	The effects of repetition on vocabulary knowledge	Applied Linguistics	28	1	46-65	2.524	187	acquisition, instructio	repetition, w
149	A	Zhao, Y.	2003	Recent developments in technology and language learning: A literature revie	CALICO Journal	21	1	7-27		181	instruction, technolo	technology-s
150	A	Chung, T., & Nation, I. S .P.	2003	Technical vocabulary in specialised texts	Reading in a Foreign Lang	15	2	103-116		175	instruction, academic	AWL, techni
152	A	Laufer, B., & Girsai, N.	2008	Form-focused instruction in second language vocabulary learning: A case fo	Applied Linguistics	29	4	694-716	2.524	172	instruction	task type, nc
162	A	McCandliss, B., Beck, I. L., Sandak,	2003	Focusing attention on decoding for children with poor reading skills: Design	Scientific Studies of Readi	7	1	75-104	3.124	170	reading, instruction	deficient dec
175	A	Nation, I. S. P.	2003	The role of the first language in foreign language learning	Asian EFL Journal	5	2	1-8		161	instruction	L1, meaning,

Figure 2. Screenshot of the VRD sorted according to the sub-topic *instruction*, then in descending order of citations numbers.

professional weight (Figure 3). By using these filtering options, the teacher could easily see which research articles are considered to be influential by other professionals in the field.

A more experienced teacher or researcher may want to identify research being conducted in specific areas of interest, such as how to best use technology to facilitate vocabulary acquisition. Filter options would enable this user to nest results using sub-topics and keywords. To begin, the database could be filtered using the sub-topics *technology* and *instruction* (Figure 4). Adding other subtopics would narrow the results. Users may choose to further refine their results by filtering according to publication date or participant age (Figure 5). These filtering features provide the flexibility needed to conduct highly targeted searches for specific information as well as more general information gathering.

In developing the filters, consideration was given to trends in user behavior when conducting online searches. While the database is not a search engine, the assumption was made that behaviors would be similar. For example, a study conducted by Jansen and Spink (2006) reported longitudinal behavioral trends for online searching such as users becoming increasingly reluctant to view results past the first page (preferring instead to alter the query) and an increasing simplicity in search terms. These trends indicate a preference for quality over quantity and a tendency to adjust search terms to generate more relevant results rather than sift through a large quantity of less relevant results. An awareness of these types of behaviors has guided the concept of multiple filtering features in the VRD in order to provide users with the capacity to tailor their searches in ways that will generate the most applicable results.



	A	B	C	D	E	F	G	H	I	J	K	
1	Typ	Authors/Researchers	Year	Title	Journal	Volur	Issue I	Pages	Impact Fa	Citatio	Sub-topics	Key Word
21	A	Kuhn, M. R. & Stahl, S.	2003	Fluency: A review of developmental and remedial practices	Journal of Educational Psy	95	1	3-21	5.267	952	reading, meta-analys	fluency, stru
22	A	Biemiller, A., & Boote, C.	2006	An effective method for building meaning vocabulary in primary grades	Journal of Educational Psy	98	1	44-62	5.267	434	instruction, reading	primary grad
24	A	Biemiller, A. & Slonim, N.	2001	Estimating root word vocabulary growth in normative and advantaged popu	Journal of Educational Psy	93	3	498-520	5.267	419	instruction, acquisitic	root words,
31	A	Silverman, R., & Hines, S.	2009	The effects of multimedia-enhanced instruction on the vocabulary of English	Journal of Educational Psy	101	2	305-314	5.267	89	instruction, technolo	ELLs, multi-n
32	A	Blewitt, P., Rump, K. M., Shealy, S.	2009	Shared book reading: When and how questions affect young children's word	Journal of Educational Psy	101	2	294-304	5.267	83	reading, instruction,	shared readi
33	A	Williams, J. P., Brooke, S. K., Lauer,	2009	Embedding reading comprehension training in content-area instruction	Journal of Educational Psy	101	1	1-20	5.267	69	reading, instruction	comprehens
38	A	Block, C. C., Parris, S. R., Reed, K. L	2009	Instructional approaches that significantly increase reading comprehension	Journal of Educational Psy	101	2	262-281	5.267	54	instruction, reading	literacy grow
40	A	Berninger, V. W., & Abbott, R. D.	2010	Listening comprehension, oral expression, reading comprehension, and writ	Journal of Educational Ps	102	3	635-651	5.267	28	acquisition, instructic	listening com
74	A	Roland, D., Dick, F., & Elman, J. L.	2007	Frequency of basic English grammatical structures: A corpus analysis	Journal of Memory and La	57	3	348-379	4.778	127	corpus-based studies	corpus, gram
107	A	Lee, O., Quinn, H., & Valdés, G.	2013	Science and language for English language learners in relation to Next Gener	Educational Researcher	42	4	223-233	3.914	49	academic vocabulary	bilingual, bic
126	A	Baumann, J. F., Edwards, E. C., Bola	2003	Vocabulary tricks: Effects of instruction in morphology and context on fifth-g	American Educational Res	40	2	447-494	3.760	200	instruction, morphol	comprehens
131	A	Comesana, M., Soares, A. P., Sanch	2012	Lexical and semantic representations in the acquisition of L2 cognate and no	British Journal of Psychol	103	3	378-392	3.469		instruction	direction ins
133	A	Weiland, C., Ulvestad, K., Sachs, J.,	2013	Associations between classroom quality and children's vocabulary and execu	Early Childhood Research	28	2	199-209	3.448	19	instruction	preschool, cl
134	A	Hammer, C. S., Hoff, E., Uchikoshi,	2014	The language and literacy development of young dual language learners: A c	Early Childhood Research	29	4	715-733	3.448	10	meta-analysis, instru	bilingual, du
136	A	Buysse, V., Peisner-Feinberg, E., Pá	2014	Effects of early education programs and practices on the development and l	Early Childhood Research	29	4	765-785	3.448	7	meta-analysis, instru	early childhc
137	A	Kim, Y. S., Al Otaiba, S., Sidler, J. F.,	2013	Language, literacy, attentional behaviors, and instructional quality predictor	Early Childhood Research	28	3	461-469	3.448	6	instruction, writing	attentivenes
145	A	Silverman, R.	2013	Investigating video as a means to promote vocabulary for at-risk children	Contemporary Education	38	3	170-179	3.159	7	acquisition, instructic	dual languag
146	A	Marulis, L. M., & Neuman, S. B.	2013	How vocabulary interventions affect young children at risk: A meta-analytic	Journal of Research on Ed	6	3	223-262	3.154	13	meta-analysis, readir	multivariate
147	A	Apthorp, H., Randel, B., Cherasaro,	2012	Effects of a supplemental vocabulary program on word knowledge and passa	Journal of Research on Ed	5	2	160-188	3.154	5	instruction, reading	elementary s
149	A	McCandliss, B., Beck, I. L., Sandak,	2003	Focusing attention on decoding for children with poor reading skills: Design	Scientific Studies of Readi	7	1	75-104	3.124	170	reading, instruction	deficient dec
150	A	Siegel, L., & Lipka, O.	2007	The development of reading skills in children with English as a second langua	Scientific Studies of Readi	11	2	105-131	3.124	81	instruction, reading	prediction, r
152	A	Kim, J., & White, T.	2008	Scaffolding voluntary summer reading for children in grades 3 to 5: An exper	Scientific Studies of Readi	12	1	1-22	3.124	76	reading, instruction	summer volu
162	A	Abbott, R., Sanders, E., & Vadasy, F	2008	Effects of supplemental early reading intervention at 2-year follow up: Readi	Scientific Studies of Readi	12	1	51-89	3.124	31	reading, instruction	intervention
175	A	Frishkoff, G., Perfetti, C., & Collins-	2011	Predicting robust vocabulary growth from measures of incremental learning	Scientific Studies of Readi	15	1	71-91	3.124	13	reading, instruction,	incremental

Figure 3. Screenshot of the VRD sorted according to the sub-topic *instruction*, then in descending order of citation numbers, then in descending order of journal IFs.

	A	B	C	D	E	F	G	H	I	J	K	
1	Typ	Authors/Researchers	Year	Title	Journal	Volur	Issue I	Pages	Impact Fa	Citatio	Sub-topics	Key Wo
72	A	Horst, M., Cobb, T., & Nicolae, I.	2005	Expanding academic vocabulary with a collaborative on-line database	Language Learning & Tech	9	2	90-110	2.362	129	technology, instructi	online voc
73	A	Stockwell, G.	2007	Vocabulary on the move: Investigating an intelligent mobile phone-based vo	Computer Assisted Langu	20	4	365-383	1.250	129	technology, instructi	mobile ph
106	A	Yeh, Y., & Wang, C. W.	2003	Effects of multimedia vocabulary annotations and learning styles on vocabul	CALICO Journal	21	1	131-144		110	technology, instructi	learning st
127	A	Abraham, L. B.	2008	Computer-mediated glosses in second language reading comprehension and	Computer Assisted Langu	21	3	199-226	1.250	101	meta-analysis, techn	reading co
131	A	Tozcu, A., & Coady, J.	2004	Successful learning of frequent vocabulary through CALL also benefits readir	Computer Assisted Langu	17	5	473-495	1.250	101	word recognition, ac	vocabulary
275	A	Cobb, T.	2007	Computing the vocabulary demands of L2 reading	Language Learning & Tech	11	3	38-63	2.362	81	technology, instructi	computer-
287	A	Hutchison, A., & Reinking, D.	2011	Teachers' perceptions of integrating information and communication techno	Reading Research Quarte	46	4	312-333	2.557	71	reading, technology,	literacy ins
330	A	Proctor, C. P., Dalton, B., Uccelli, P.	2011	Improving comprehension online: Effects of deep vocabulary instruction wit	Reading and Writing	24	5	517-544	1.771	41	technology, instructi	online inte
349	A	Constantinescu, A. I.	2007	Using technology to assist in vocabulary acquisition and reading comprehens	Internet TESL Journal	13	2			34	reading, acquisition,	comprehe
828	A	Cobb, T., & Horst, M.	2011	Does Word Coach coach words?	CALICO Journal	28	3	639-661		20	technology, instructi	video gam
830	A	Henry, A.	2007	Evaluating language learners' response to web-based, data-driven, genre tea	English for Specific Purpo	26	4	462-484	1.721	20	technology, instructi	technology
909	A	Goldman, S. R., & Scardamalia, M.	2013	Managing, understanding, applying, and creating knowledge in the informat	Cognition and Instruction	31	2	255-269	2.042	17	technology, instructi	document
978	A	Macaruso, P., & Rodman, A.	2011	Efficacy of computer-assisted instruction for the development of early litera	Reading Psychology	32	2	172-196		17	technology, instructi	computer-
1066	A	Pérez Cañado, M. L.	2010	Using virtual learning environments and computer-mediated communicatior	Computer Assisted Langu	23	2	129-150	1.250	16	technology, instructi	teacher tra
1194	A	Pasfield-Neofitou, S.	2011	Online domains of language use: Second language learners' experiences of v	Language Learning & Tech	15	2	92-108	2.362	14	technology, instructi	virtual con
1207	A	Pérez-Paredes, P., Sánchez-Tornel,	2011	Tracking learners' actual uses of corpora: Guided vs. non-guided corpus cons	Computer Assisted Langu	24	3	233-253	1.250	14	corpus-based studies	corpus ling
1227	A	Cobb, T.	2006	Internet and literacy in the developing world: Delivering the teacher with the	Educational Technology R	54	6	627-645		13	technology, instructi	online lear
1253	A	O'Bryan, A.	2008	Providing pedagogical learner training in CALL: Impact on student use of lang	CALICO	26	1	142-159		13	technology, instructi	CALL, voca
1281	A	Hilte, M., & Reitsma, P.	2011	Activating the meaning of a word facilitates the integration of orthography:	Journal of Research in Rea	34	3	333-345	1.328	12	technology, instructi	spelling, or
1322	A	Li, J.	2009	The evolution of vocabulary learning strategies in a computer-mediated read	CALICO	27	1	118-146		12	reading, technology,	CALL, voca
1460	A	Gorjian, B., Moosavinia, S. R., Ebra	2011	The impact of asynchronous computer-assisted language learning approache	Computer Assisted Langu	24	5	383-391	1.250	11	technology, instructi	asynchron
1617	A	Loucky, J. P.	2010	Comparing electronic dictionary functions and use	CALICO Journal	28	1	156-174		8	dictionary use, techn	electronic
1633	A	Wu, S., Franken, M., & Witten, I.	2010	Supporting collocation learning with a digital library	Computer Assisted Langu	23	1	87-110	1.250	8	multi-word and collo	CALL, collo
2008	A	O'Loughlin, R.	2012	Tuning in to vocabulary frequency in coursebooks	RELC Journal	43	2	255-269		4	technology, instructi	textbooks,

Figure 4. Screenshot of the VRD sorted according to the sub-topics *technology* and *instruction*, listed in descending order of citation numbers.

	D	E	F	G	H	I	J	K	L	M	N
1	Title	Journal	Volur	Issue I	Pages	Impact Fa	Citatio	Sub-topics	Key Words	Participant	Public Avail
330	Improving comprehension online: Effects of deep vocabulary instruction wit	Reading and Writing	24	5	517-544	1.771	41	technology, instructi	online intervention, vocabular	K-12	Abstract only
828	Does Word Coach coach words?	CALICO Journal	28	3	639-661		20	technology, instructi	video games	K-12	Abstract only
978	Efficacy of computer-assisted instruction for the development of early litera	Reading Psychology	32	2	172-196		17	technology, instructi	computer-assisted instruction	pre-K, K-12	Abstract only
1281	Activating the meaning of a word facilitates the integration of orthography:	Journal of Research in Rea	34	3	333-345	1.328	12	technology, instructi	spelling, orthography, phonol	K-12	Abstract only
1322	The evolution of vocabulary learning strategies in a computer-mediated read	CALICO	27	1	118-146		12	reading, technology,	CALL, vocabulary strategies, C	K-12	Abstract and
2256											
2257											

Figure 5. Screenshot of the VRD sorted according to the sub-topics *technology* and *instruction*, listed in descending order of citation numbers, and limited to the participant age K-12.

The following sections detail the overall formatting and the individual columns of the database, and explain how users can manipulate the filters to yield optimal results.

Formatting

All citations in the database conform to formatting standards outlined in the *Publication Manual of the American Psychological Association* (6th ed.). After importing the references from RefWorks to Excel, much of the information had non-standard capitalization, punctuation, and formatting of author names. All of these have been corrected and made consistent with APA standards. The RefWorks interface was not used by the current developer because inconsistencies in citation style are preserved when importing references with this tool.

Publication Information

Publication information about each entry is listed in the first columns, including a "type" code (A for articles, BR for book reviews), author/s, publication year, the title of the article or review, the journal, and volume, issue, and page numbers. Each of these columns has filters, so users may target certain years, journals, or authors. The filters are relatively flexible in how they can be applied. For example, the author column may be sorted alphabetically by the first author's last name. To search for a specific author, a user would click on the filter arrow in the author column and type the name into the search box. All results with that name would then be listed. In order to search for a specific journal, users would click on the filter arrow in the journal column and use the filter search box to search for the journal. In order to see all articles published in *Applied Linguistics,* a user would click on the filter arrow in the journal column, then type "Applied Linguistics" (using quotation marks) into the search box. All of the results for that journal would then be listed. Using the filter without quotation marks would yield all journals

with the words *applied linguistics* in their names (e.g. *International Journal of Applied Linguistics, Annual Review of Applied Linguistics,* etc.)

Sub-Topics

Sub-topics are specific areas of interest in vocabulary research and will likely be the first tool users will employ for searching. They were chosen based on relevant topics as determined through the expertise of Dr. Gardner, through trends evident in the research itself as noticed by the developer, and by distilling several of the search terms (see Appendix A). Some sub-topics cast a wider net than others and will yield more results (e.g. *instruction* vs. *dictionary use*), but all are distinct areas of interest. There are 25 sub-topics that have been used to categorize the articles (see Table 2). Most references have been tagged for more than one sub-topic, depending on the information covered in the article.

Users may filter the information in the database according to the sub-topic they are interested in and may also select more than one sub-topic. For example, a teacher interested in what type of instruction is most beneficial for students reading new academic material might sort the database according to the sub-topics *instruction, reading,* and *academic vocabulary.* The database filters will then sort the citations according to the references that have tags for all of those sub-topics.

Keywords

In addition to sub-topics, keywords have also been included to help narrow the scope of searches. Keywords were taken directly from the article abstracts where available. Where keywords were not listed, they were selected by the developer after reading the abstract (and in some cases the article) to determine which keywords would best describe the content. As an example, if a user would like specific information regarding whether or not direct vocabulary

instruction is beneficial to reading students, the results gathered from a sub-topic search on *reading* could then be sorted according keywords such as *direct instruction, comprehension, leveled reading,* etc. There is not a separate comprehensive list of keywords included with the database because of the quantity and variety of keywords. However, users may sort by sub-topic and then skim the results to get an idea of which keywords may give them the best results, then filter the results again using additional keywords.

Table 2

VRD Sub-topics

Language Skill Areas	**Neural Processing**	**Teaching**	**Technology**	**Academic**
reading	acquisition	instruction	corpus-based studies	academic vocabulary
writing	morphology	assessment	multi-word and collocation	word list
listening	phonology	feedback	discourse analysis	English for Specific Purposes (ESP)
speaking	word formation	dictionary use	technology	meta-analysis
	word recognition	special needs		
	word meaning			
	awareness			
	language processing			

Other Features

The other features included in the VRD include citation numbers, journal impact factors (IFs), participant ages, and hyperlinks. As mentioned earlier, citation information will help users to quickly pinpoint which articles are most significant within a given topic of interest. For example, an article that has been cited more than 100 times is likely to be more important than one that has been cited fewer than ten times, depending on the publication date. Citation information was taken from Google Scholar and will be updated periodically. Google Scholar

citation numbers were higher than those listed in the LLBA, which reflects the more limited scope of the data listed in the LLBA (see Georgas & Cullars, 2005). A longitudinal study conducted by Harzing (2013) also demonstrated the stability and comprehensive coverage of Google Scholar citation data.

Journal IFs will also be useful for users, as they reflect the number of times articles appearing in a given publication have been cited in other journals. Journals with higher impact factors have been cited more often in other publications. The database delineates impact factors through color, with one-year IFs in black and five-year IFs in orange. Journal IFs were obtained from the Journal Citation Reports (JCR) database, which reports both five- and one-year impact factors. When both numbers were available, five-year IFs were given preference because they provide a more stable picture of a journal's citation record (and subsequent influence) over time. The one-year IF was used in cases where the five-year number was not listed. The IF column was left blank for journals not included in the JCR database. Especially for users unfamiliar with publications in the linguistics field, IFs provide a simple guide to knowing which journals publish the most influential research.

Participant age groups are useful for educators or researchers with an interest in specific ages. The age groups included are pre-K, K-12, and adult. Where there is overlap (e.g. a study that uses pre-K, K, and grade 1 students), all applicable age groups are labeled in the reference (pre-K and K-12 in the previous example). Only studies that actually used participants were tagged with this feature. Articles that merely refer to age groups were not tagged in order to preserve the distinction between studies conducting primary research and those discussing secondary research.

When available, hyperlinks to the abstract page for each reference have also been provided. In accordance with recommendations provided by a copyright specialist at Brigham Young University, care was taken to ensure that hyperlinks lead only to publisher sites or directly to publicly available documents (for open-content journals) and do not link to second- or third-party sites or aggregators.

Concentric Circles of Relevance: Criteria for Inclusion

Vocabulary is not an isolated area of study. It is related to many other research fields, such as language acquisition, psycholinguistics, education, etc. Decisions on what to include in the VRD were shaped by how intrinsic vocabulary was to the research being conducted. The process was systematic though still subjective.

As an example of the decision-making process, a few hypothetical studies might be considered, using the sub-topic of *reading*. A study that investigates how reading influences vocabulary acquisition would definitely be included. A study that lists vocabulary as one of several factors affecting reading comprehension would also be included. A study investigating student attitudes toward reading might be excluded unless vocabulary was mentioned as a contributing factor. A study investigating the effectiveness of round robin reading with no mention of vocabulary would be excluded. While reading is an area of interest related to vocabulary, and users of the database might be interested in all research related to reading, only research where vocabulary was a salient part of the study was included.

Limitations

The VRD is a powerful tool for educators and researchers to access modern vocabulary research. It is not necessarily intended to be a stand-alone resource (though it can be), but instead to work in tandem with other databases and search engines that potentially offer greater breadth

and chronological coverage. The strength of the VRD is its power to organize a large amount of recent research and target specific areas in unique ways.

The current iteration of the VRD does not have the technological capacity to automatically update citation numbers. These will need to be periodically updated by future developers. If users are interested in the latest citation numbers, they can consult the entry in Google Scholar for any given article. Journal IFs will also need to be updated manually, though the current entries will give users a general idea of how often the publications are cited elsewhere. Five-year IFs, indicated in orange, are relatively stable. Other recommendations for future work are addressed in Chapter 5.

Chapter Four: Evaluation and Review

Assessment of the Vocabulary Research Database (VRD) generally fell into two general areas: content and features. Content evaluation included both the quality and quantity of research articles listed in the database and was determined by the current developer and by independent external reviewers. The developer was the primary source for determining quality, which included reviewing previous entries added by earlier graduate students, and then deciding which research articles to add to the database. The limitations and strengths of a human-generated database were briefly discussed in Chapter 3, and recommendations for refining this process will be presented in Chapter 5. The current developer also completed an analysis on the quantity of items, comparing results for similar search terms between the Vocabulary Acquisition Research Group Archive (VARGA) and the VRD. The VARGA was selected for comparison because it is the only other extant online non-subscription vocabulary database with up-to-date content, unlike the Waring database which ends in the year 2001.

Three external reviewers were provided with a downloadable Excel file of the VRD and access to the online Google Document version. They completed an online survey that included questions from the two areas of interest: quality and quantity of the content, and effectiveness of the features. The following sections will detail the evaluation process, including the quantity analysis conducted by the developer and the results of the external review.

Developer Assessment: Quantity and Quality

Quantity and quality are interrelated, with a tacit assumption often made that quality suffers when quantity is a focus and vice versa. One goal for the VRD was to balance these two interests as successfully as possible. Determining the quality and relevance of each article during the selection process is one advantage of having a human-generated database; however, there are

admittedly fewer articles in the VRD than there are in an automated search engine such as Google Scholar. The VARGA database is the only other free, current, online database that is also curated by people rather than web crawlers. As such, it was selected for comparison to the VRD, even though its focus is primarily on research related to acquisition rather than vocabulary research generally.

Results of a quantity evaluation of both databases using several sample search terms are presented in Table 3. In the VARGA database, the search term was entered into the search box on the home page and the number of results was obtained at the bottom of the results page. A wild card search was used to ensure the highest number of results (e.g. morph* would find entries containing morpheme, morphology, morphological, morphologically, etc.). In the VRD, the search terms were used to filter the sub-topic and/or keyword column, and the results were counted. In both databases, the search covered the years 2000-2014. Search results were extracted on October 12, 2015.

Quantity measures such as these are relatively straightforward. However, determining the quality of the articles is a more subjective endeavor. In the VRD, it would be possible to sort the results for any given search term by citation numbers, thus providing easy access to the most cited articles as an indirect measure of quality. The VARGA does not include citation data, so any measure of quality would be entirely subjective. A similar evaluation of the VRD would also be subjective, but assuming that it is possible to mitigate subjectivity with professional expertise, the VRD was submitted to three language experts for external review and measured for both quality and quantity.

Table 3

Quantity Comparison on Sample Search Terms

Search Term	VARGA	VRD
academic	77	254
assessment	46	136
breadth	20	22
cognate	32	22
collocat*	65	210
context*	90	69
core vocabulary	2	9
corpus/corpora	83	339
decod*	14	41
depth	44	41
idiom*	10	64
incidental	65	59
morph*	24	124
phras*	20	55
technology	43	193
semantic*	61	104
word list	41	36

External Review: User Experiences as Reported on an Online Survey

The VRD was reviewed by two faculty members of Brigham Young University-Hawaii and a high school language teacher. Responses were anonymous in order to encourage candor. Participants in the review process were asked to read and provide feedback on the User

Instructions (see Appendix B), to navigate the VRD to find articles of personal interest, and to complete an online survey (see Appendix C). All three participants accessed the VRD using the downloadable Excel file and the Google Doc version, and all three indicated that they preferred the downloaded file, even though the hyperlinks were more functional in the Google Doc. Each prompt in the online survey had a text box available for reviewers to provide the reasoning for their response. However, explanatory comments were optional rather than required in the survey, and were often not provided by the reviewers. The numeric results provide insight into the reviewers' experiences, but additional commentary would have been helpful in determining several key points. These would be candidates for further study in the future.

The first section of the online survey asked for feedback on the User Instructions. These instructions will be available to all users of the VRD and are intended to provide the background information necessary in order to understand the content of the database and how to use the search filters. The User Instructions include a general description of the database, filtering instructions, and detailed column descriptions, including a table listing the sub-topics. Reviewers were asked to provide feedback based on a ten-point Likert scale, with 1 being the most negative response and 10 being the most positive. The average numeric results are listed in Table 4.

The lowest score of the four provided feedback on the general description of the VRD. An effort was made to keep the User Instructions concise; however, users who are unfamiliar with the database may need a more detailed description of what the VRD includes, why it is valuable, and how they can use it to effectively enhance their research or instruction needs.

Table 4

Average Results for the User Instructions

Survey Prompt	Average Result
The description of the VRD was complete enough to understand the nature and purpose of the database.	6.50
The filtering instructions were clear and easy to follow, even for users who may not be familiar with Excel.	8.00
The column descriptions provided sufficient information.	8.67
After reading the User Instructions, I understood how to search and filter the VRD.	6.75

There is a slight discrepancy in the results of the second and fourth prompts, both of which deal with the filtering feature. Reviewers indicated that the instructions were clear and easy to follow (with an average score of 8.00) but did not seem to feel comfortable using the filters after reading the instructions (average score of 6.75). This may be due to unfamiliarity with actually using the filters, which is quintessentially different from reading about using the filters (i.e. reading about how to use the filters was easier than using the filters). This is an area that may need further study in order to improve and clarify the User Instructions.

In the next section, there were three prompts that were designed to measure the features and functionality of the VRD, including all of the filters generally, the hyperlinks, and the sub-topics and keywords. Sub-topics and keywords were measured separately because there is a conceptual element to them, the sub-topics having been assigned by the VRD developer and keywords primarily extracted from the article abstracts. It is also anticipated that these two features will be heavily used when users search for articles of interest. The survey prompts and average results are shown in Table 5.

Table 5

Average Results on VRD functionality and features

Survey Prompt	Average Result
The filters worked as intended.	7.00
The hyperlinks worked.	7.33
The sub-topics and keywords were helpful in finding relevant information.	6.33

Each prompt on the survey allowed for comment in a text box, but only one participant provided commentary feedback in this section. On the hyperlinks, the one comment was, "Not in the Excel version, but they did in the Google Docs," indicating that the hyperlinks only worked in the Google Doc. The inconsistency between how the hyperlinks perform in the downloadable Excel file and the Google Doc has been noted by the developer, but the cause is as yet undiagnosed. In particular, the full-text PDF links work well in Google but not in the Excel file.

The numeric score of 6.33 on the third question (regarding the helpfulness of the sub-topics and keywords) conflicts slightly with results from a later question in the survey. When asked to rank the features in order of importance, all three participants ranked the keywords as the most valuable, and two of the three ranked the sub-topics as second-most valuable. Based on that information, the respondents almost unanimously considered keywords and subtopics to be the most important features, but the score of 6.33 does not reflect that. This would also be an area for future study in order to determine if the discrepancy stems from the functionality of the filters or if there is a larger conceptual problem with how the sub-topics and keywords were selected. Given the relatively low score of 7.00 on the first question asking if the filters worked as intended, it is likely that the difficulty lies in the functionality of the filters rather than the sub-

topics and keywords themselves. Follow-up information from users would be useful in determining how to best address this.

In the next section of the online survey, participants were asked to rank all eleven of the features of the VRD in order of value, with number 1 being most valuable and 11 being least valuable (see Figure 6). Reading the chart in horizontal rows gives an idea of how the information in each column fared in the review. For example, the first column is the type code, and one respondent ranked it as 6, one as 7, and one as 11, meaning that two of the three respondents found that information to be of medium value and one found it the least valuable. All three respondents marked the keywords as being most valuable; two of the three marked sub-topics as second. Results were mixed on the other features, with little consensus on preference. Surprisingly, citation numbers came in at number 9, 10, and 11 between the three respondents, indicating that they were considered to be less valuable than most of the other features.

#	Answer	1	2	3	4	5	6	7	8	9	10	11	Total Responses
1	Type code (A or BR)	0	0	0	0	0	1	1	0	0	0	1	3
2	Author	0	1	0	0	1	1	0	0	0	0	0	3
3	Year	0	0	1	1	0	0	1	0	0	0	0	3
4	Title	0	0	1	1	1	0	0	0	0	0	0	3
5	Volume, Issue, Page Numbers	0	0	0	0	0	0	1	1	0	1	0	3
6	Impact Factor	0	0	0	0	0	0	0	1	2	0	0	3
7	Citation Numbers	0	0	0	0	0	0	0	0	1	1	1	3
8	Sub-Topics	0	2	0	0	0	1	0	0	0	0	0	3
9	Key Words	3	0	0	0	0	0	0	0	0	0	0	3
10	Participant Age	0	0	1	0	0	0	0	1	0	1	0	3
11	Hyperlinks	0	0	0	1	1	0	0	0	0	0	1	3
	Total	3	3	3	3	3	3	3	3	3	3	3	-

Figure 6. Ranked responses on the value of VRD features. One is the most valuable, and 11 is the least valuable.

Only one participant provided general feedback on the features and functionality of the VRD. This comment read: “I think that it is very useful to be able to locate an article/reference on topic, then quickly access it through the hyperlinks. I found it easier to use the filters in the Excel version, but that could be that I am more familiar with Excel than Google Docs. When I used the hyperlinks in Excel, it took me to the site but the text was unreadable; the links did work in Google Docs.”

Participants were next asked to provide feedback on the quality of the VRD content. There were three prompts that asked respondents to provide feedback based on a ten-point Likert scale, similar to the previous sections. The average results are shown in Table 6. None of the participants provided text commentary for this section of the survey. The numeric results are satisfactory overall, with relevance and quality obtaining the highest score.

Table 6

Average Results on VRD content

Survey Prompt	**Average Result**
There is a sufficient quantity of articles.	7.67
The articles were relevant and high quality.	8.33
The VRD is a valuable resource for vocabulary researchers and instructors.	7.33

The next question on the survey asked the participants if there were any sub-topics not currently listed that they would like to see included in future iterations of the VRD. Two of the three respondents said no; one said yes, and wrote, “More articles about self-assessment of vocabulary.” The current sub-topics include *assessment*, but there is no distinction between assessment and self-assessment at the sub-topic level, though it may be indicated in the keywords. It is unclear whether the user comment relates to actual quantity of self-assessment

articles or the inability to locate them in the database without a specific sub-topic for that area of interest. This highlights the need to ensure that the filters effectively facilitate user searches in ways that provide optimal results. The User Instructions could be amended to include a section with recommendations on how to conduct more extensive searches if the sub-topics do not specifically target what users are looking for.

At the end of the online survey, only one respondent replied to the text prompt for general comment on the VRD, writing "Very useful tool!" Information in the previous questions has consequently been used to determine a positive overall response to the VRD, with the quality of the articles slightly outscoring quantity, and content generally outscoring features and functionality. It is probable that future feedback will become more varied as the pool of users expands and diversifies. For example, K-12 teachers may find some aspects of the VRD to be more or less important than applied linguists. As the VRD becomes more widely available and additional feedback is gathered and implemented, it is anticipated that all aspects of the VRD will continue to improve.

Chapter Five: Future Recommendations and Conclusion

The Vocabulary Research Database (VRD) was created in response to the need for free, effective, and organized access to the vast amount of vocabulary-related research that has been produced over the past several decades. While other vocabulary-specific search options currently exist, such as the Waring database and the Vocabulary Acquisition Research Group Archive (VARGA), the VRD offers a greater degree of state-of-the-art content and filtering options that provide users with a higher degree of granularity than is possible with the other databases. The VRD also offers results with less noise and fewer irrelevant articles than occur in general online databases such as Google Scholar.

Because the VRD is updated by individuals rather than automated web crawlers, it is suggested that a consistent updating framework be created so users can anticipate how regularly and often content will be added and citation numbers and journal impact factors will be renewed. Given the projected long-term nature of the VRD's existence as part of a website sponsored by Dr. Dee Gardner and the probability that several different people will manage the addition of future content, it is also suggested that protocols be developed for the process of searching and adding articles.

For the sake of consistency and training, a rubric with guidelines for deciding which articles to include would be helpful. Rubric content could include items such as whether the word "vocabulary" appears in the article abstract or keywords, whether the research studies text at the word level (as opposed to sentence or discourse level), whether there are other signal words in the abstract such as "lexical" or "word," and whether there is either a clear or implied focus on how words contribute to meaning. Having a rubric would help delineate criteria for article inclusion in areas where there is topical overlap, especially when articles address VRD

sub-topics (such as *reading* and *instruction*) but there is no overt or even implied emphasis on vocabulary. This would also help to mitigate the subjectivity and potential inconsistency inherent in having different people selecting content over time. Another useful aspect of the rubric might be to include directions on how to cap the quantity of content, particularly on topics that have a larger body of research available for possible inclusion. This type of guideline would be helpful in order to maintain feasibility for the developers as well as manageability for users.

In Chapter 4 it was noted that the evaluation process revealed a potential discrepancy between the perceived value of the VRD filters and the actual functionality of the filters. For example, the independent reviewers almost unanimously listed the sub-topics and keywords as the most important features of the VRD, yet the online survey prompt that stated, "The sub-topics and keywords were helpful in finding relevant information" only yielded an average score of 6.33 out of 10. This potentially suggests that the sub-topics and keywords are conceptually sound but that the users had difficulty applying the filters to find the information they were looking for. Further study on this discrepancy is needed in order to determine the precise reason for the conflicting information. Improvements could be made to the User Instructions to clarify filter instructions, and future online help could also include video instructions demonstrating how to use the filters effectively.

A final area for future improvement is the technical performance of the database overall, including determining, if possible, why the hyperlinks work well in the Google Doc version but not in the downloaded file. User feedback on difficulties with the filters should also be investigated and repaired accordingly. Specific technical expertise may be needed for this type of troubleshooting as well as for potentially converting the VRD into a permanent online database, eliminating the duality of having a downloadable file and Google Doc version. While identifying

these areas of future improvement has been an integral part of this thesis, further investigation and implementation of solutions is outside the scope of this project.

As it currently stands, the VRD is a valuable resource for vocabulary researchers and instructors in terms of quality, quantity, relevance, and state-of-the-art content. It has more search features than other existing vocabulary-specific free online databases, making it both flexible and efficient. It also has a greater quantity of current content than similar databases. With all of these benefits, it can still function in tandem with other research resources, whether they are subscription-based (such as the LLBA) or more general (such as Google Scholar). It is a powerful new instrument in the growing body of research tools available for language professionals interested in current vocabulary research.

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Appendix A: Search terms used to find articles for the VRD

academic code
academic vocabulary
assessment
automaticity
bilingual dictionary
bilingual reading
cognate
collocate
collocations
content-based instruction
context and learning
core vocabulary
corpora
corpus
data-driven learning
decoding
dictionary
disciplinary literacy
discourse markers
dual language
extensive reading
false friends
fluency
formulaic sequences
homograph
homonym
homophone
idiom
incidental word learning
inference
intensive reading
intentional word learning
interdependence hypothesis
lexeme
lexical
lexical access
lexical bundles
lexical chunk
lexical competence
lexical complexity
lexicography
lexicon
lexis
list learning
literacy
math language
mental lexicon
mnemonic
monolingual dictionary
morpheme
morphology
multi-word units
phrasal lexicon
phrasal verbs
phraseology
phrases
polysemy
reading vocabulary
rote learning
schema theory
school language
science language
self-assessment
semantic clustering
semantic feature analysis
semantic maps
semantics
threshold hypothesis
usage-based
vocabulary breadth
vocabulary depth
vocabulary logs
vocabulary test
word coverage
word meaning
word recognition
word sense
working memory

Appendix B: User instructions for the VRD

VRD Description

The VRD database is a compilation of vocabulary-related research articles spanning the years 2000-2014. Designed primarily as a resource for vocabulary researchers and language instructors, the database has several features that will enable users to efficiently find information that is most relevant to their needs.

The VRD is currently in the form of an Excel document (Excel 2011) and is available online as a Google Doc or to download as an Excel file. The reference information for each article, such as author names, article title, and journal, is organized into individual columns.

If there is something specific that a user would like to search for in the entire database (e.g. a certain article or journal), the search box in the upper right corner of the database may be used. Each column also has filtering options that users may employ to explore and organize the research listed.

Filter Instructions

These instructions describe the options available when using the filters in the VRD.

Note: Google Doc users may follow the filter instructions but should do so using the "Filter Views" option. This allows multiple users of the same document to view filtered results without affecting the way the document looks to other users. Google provides detailed instructions for how to use Filter Views here: https://support.google.com/docs/answer/3540681?hl=en

Arrow Box: Click on the arrow box next to the column title. This will bring up a filter box. You may type in specific search terms (such as keywords or subtopics) or choose to sort by ascending/descending. When you are finished looking at the filtered results, click on the arrow box again and click the "Clear Filter" button to restore the database to its original state or click the "undo" button.

Wildcard Searches: When using a search box in the filters, users may perform a wildcard search. This allows users to find all results without needing to use exact terminology for each. For example, the wildcard search *lex** will return all results beginning with *lex,* including *lexeme, lexical, lexicon, lexicology,* and so on. This is particularly useful given the varied nature of keywords. Google Doc users do not need the asterisk to perform a wildcard search.

Multiple Filters: Multiple filters may be used at the same time. For example, the sub-topics may be sorted for articles on writing, then sorted according to the number of citations. This would quickly give users an idea of which articles are most significant within the area of writing.

Excel features: Users may also use the sort and filter features available on the Data tab of the Excel document to perform custom sorts and filtering options.

VRD Content

The following column descriptions will help users understand the information contained in each column of the database.

A
Column A lists the code for the entry type—A for articles and BR for book reviews. The majority of entries are research articles.

B
Column B lists the authors and/or researchers. The names are formatted in APA style (6th ed.). Diacritics remain if they were preserved during the importing process but were not added if not.

C
Column C is the publication year. This may be filtered in order to see the most recent research first.

D
Column D is the title of the research article or the book citation (for book reviews). These are also formatted in APA style.

E, F, G, H
These columns are, respectively, the journal title, volume, issue, and page numbers.

I
Column I contains the journal Impact Factor (IF). Impact Factors are numbers that reflect the average number of times articles in any given journal have been cited. A higher IF means that articles in that journal were cited in other research more often. Numbers in black are one-year IFs, which reflect citation averages for the past year. IFs in orange are five-year impact factors, which reflect citation averages for the past five years. Impact Factors were obtained from the Journal Citation Reports database through the Harold B. Lee Library at Brigham Young University.

J
Column J lists the number of times the article has been cited by other researchers. This number was obtained through the data listed in Google Scholar entries.

K
Column K provides sub-topic "tags," which are general categories of study within the field of vocabulary. These categories are loosely organized in Table 1 according to possible areas of interest.

Table 1: VRD Sub-topics

Language Skill Areas	Neural Processing	Teaching	Technology	Academic
reading	acquisition	instruction	corpus-based studies	academic vocabulary
writing	morphology	assessment	multi-word and collocation	word list
listening	phonology	feedback	discourse analysis	English for Specific Purposes (ESP)
speaking	word formation word recognition word meaning awareness language processing	dictionary use special needs	technology	meta-analysis

"Tagging" means that an article has been assigned to a sub-topic category. The filter feature at the top of the sub-topic column may be used to sort the database according to these tags. To help ensure relevance of results, articles have been tagged with as many categories as pertain to the information covered in the article. Multiple tags enable users to cast search nets of varying widths. For example, if a user is interested in recent trends in vocabulary instruction, the database could be filtered according to the tag "instruction" and the user could then peruse the results, which will encompass many aspects of teaching vocabulary. If a user is specifically interested in how to teach using dictionaries or improve reading strategies, those additional sub-topic tags could be added to the search, yielding more narrow results.

L

Column L lists keywords for the articles, providing further granularity beyond that given by the sub-topic tags. Keywords listed in abstracts were used when available. If article abstracts did not list keywords, they were generated by the current database compiler (Melissa Young) according to information in the abstract.

M

For articles conducting primary research, the general age of the participants is listed here. These ages are *pre-K*, *K-12*, and *adult*. The *adult* label was applied to participants 18 years of age or older. This feature further enables users to sort the information according to areas of interest and also discriminates between articles consisting of primary and secondary research.

N

This column informs users of the public availability of the articles listed and provides hyperlinks to the research whenever possible. In most cases, the links lead to the abstract page of the publisher. Full text links were included when available for open-access journals. For articles listed as PDF Downloads, the title of the article may be searched in Google Scholar and the download obtained from the search results.

O

This column provides any extra information of interest on the articles, such as awards or multiple publication sites.

Appendix C: Online survey

This survey is intended to gather data regarding your experience with the Vocabulary Research Database (VRD). Responses are completely anonymous. Information gathered will be used to make improvements to future iterations of the VRD and may be reported as part of a TESOL MA thesis.

The survey should take approximately 10 minutes or less. It is divided into three sections: User Instructions, the VRD functionality, and the content of the VRD. Text boxes are available on each question to provide additional comment but they are not required.

On the scale ratings throughout the survey, 0 indicates the least positive rating and 10 the most positive.

Thank you for your participation.

User Instructions

These options ask for feedback on the User Instructions for the Vocabulary Research Database (VRD). You may add comments for each response in the text box. For each question, drag the red circle to the desired number.

The description of the VRD was complete enough to understand the nature and purpose of the database.
(text box)

The filtering instructions were clear and easy to follow, even for users who may not be familiar with Excel.
(text box)

The column descriptions provided sufficient information.
(text box)

After reading the User Instructions, I understood how to search and filter the VRD.
(text box)

General comments on the User Instructions:
(text box)

VRD Functionality

These options ask for feedback on the functionality and features of the VRD. You may add comments for each response in the text box. For each question, drag the red circle to the desired number.

The filters worked as intended.
(text box)

The hyperlinks worked.
(text box)

The sub-topics and key words were helpful in finding relevant information.
(text box)

Which features of the VRD do you consider to be most valuable? Please rank in order, with 1 being the most important.
- Type code (A or BR)
- Author
- Year
- Title
- Volume, Issue, Page Numbers
- Impact Factor
- Citation Numbers
- Sub-Topics
- Key Words
- Participant Age
- Hyperlinks

Did you use the Google Doc version or download the Excel file?
- Google Doc
- Excel
- both

For Google Doc users, please list the browser you used to access the document:
- Firefox
- Google Chrome
- Safari
- Internet Explorer
- Other

General comments on the VRD functionality and features:
(text box)

VRD Content

These options ask for feedback on the content of the VRD. You may add comments for each response in the text box. For each question, drag the red circle to the desired number.

There is a sufficient quantity of articles.
(text box)

The articles are relevant and high-quality.
(text box)

The VRD is a valuable resource for vocabulary researchers and instructors.
(text box)

Are there any sub-topics not included in the VRD that you would like to see included in future updates?
(text box)

Yes (text box)
No

General comments on the content of the VRD:
(text box)