

Developing and Testing a Web Based Vocabulary Intervention for High School Students

Study Now!



SCROLL Lab: South Carolina Research on Language & Literacy Lab
http://sp.sc.edu/com/scroll

Suzanne Adlof, Ph.D. Joanna Scoggins, M.Ed. Elaine Miller, MAT
Adam Kapelner, Ph.D. Margaret McKeown, Ph.D. Charles Perfetti, Ph.D.

Introduction

Many high school graduates do not possess adequate vocabulary knowledge for success in college and careers (ACT, 2010; NCES, 2009). Unfortunately, research evidence and evidence-based resources for high school vocabulary instruction are lacking. To address this gap, this project is aimed at the iterative development and evaluation of a web-based vocabulary intervention platform, DictionarySquared (D²), intended to provide high quality, individualized vocabulary instruction to high school students. The long-term goals are to (a) develop to develop a platform that can provide effective, individualized instruction of virtually any English word, and (b) to test whether regular usage of the platform increases students' overall vocabulary knowledge and reading comprehension.

The **Theory of Change** is informed by the following:

- A primary source of individual differences in word knowledge is differences in the quantity and quality of word experiences (Hart & Risley, 1995; Reichle & Perfetti, 2003; Perfetti, 2007; Stanovich, 1986).
- Cumulative experiences with words in varying contexts enable learners to acquire rich, decontextualized representations of word meanings (Reichle & Perfetti, 2003; Nagy & Scott, 2000).
- Although much of vocabulary learning is incidental, explicit instruction can enable effective and efficient learning of specific target words (cf. Coyne et al., 2007; Beck et al., 2013).
- Providing definitions in addition to usage examples may assist learners in encoding the correct meaning (cf., Bolger et al., 2008; Elgort et al., 2016).
- Distributed practice and intermittent testing results in better retention of learned information than massed practice or study alone (Cepeda, Vul, Rohrer, Wixted, & Pashler, 2008; Roediger & Karpick, 2006).

Thus, the **Instructional Components** of the intervention include dictionary definitions, authentic contextual examples of usage, activities to encourage active processing, and a spaced practice schedule featuring intermittent test opportunities.

Target Words. Although the long-term goal is to develop a scalable platform that can be used to teach any word in the English language, we limited the set of target words during iterative development to afford quality control. The core list of 1,000 target words is divided into 10 difficulty bands, based on word frequency and age-of-acquisition. Words within each band were carefully selected according to criteria described by vocabulary experts for choosing "useful" words for instruction (Beck McKeown, & Omanson, 1987; Nation, 2001; Stahl & Nagy, 2006). Overall, because words that are more frequent may be perceived as easier to learn and more useful to know, the utility of teaching words in the lower/easier bands may be more obvious than words in the higher bands. However, considering the wide range of individual differences in high school students' vocabulary knowledge, our goal was to include an ample number of challenging-yet-useful words to stretch the vocabularies of students from very low to very high ability levels.

Sample Target Words from Each Difficulty Band

Difficulty Band	Average SFI	Average AoA	Sample Words
1	50.3	10.5	evaluate; keen; rational; transmit
2	42.7	11.2	defiant; flourish; lumbering; merge
3	38.9	11.7	alleviate; bellow; coincide; whimsical
4	36.5	12.2	cliché; maverick; precocious; rebuke
5	34.9	13.0	abdicate; cognizant; impunity; talisman
6	32.7	13.9	esoteric; frenetic; guile; sonorous
7	30.2	14.8	derisive; idiosyncrasy; putative; reprobate
8	27.5	15.2	abeyance; neophyte; recidivism; tantamount
9	23.0	15.2	besmirch; proclivity; salubrious; vagary
10	19.7	15.9	ebullient; literati; scurrilous; turgid

Note. SFI = Standardized Frequency Index (Zeno et al., 1995). AoA = Age of Acquisition (Kuperman et al., 2012)

Acknowledgments

We are grateful for the participation of all students and teachers who assisted with our studies. We thank Jeanine Soterwood and Shaley NessAiver for their help in the iterative development of the DictionarySquared research site. We also thank the members of the SCROLL Lab who assisted with site testing and data processing. This research is supported by a grant from the Institute of Education Sciences (R305A130467; PI: Adlof).

Presenting Author Contact Info

Suzanne Adlof
sadlof@mailbox.sc.edu

Joanna Scoggins
jscoggin@mailbox.sc.edu



Placement Quiz

Students complete a self-assessment to determine the starting point for instruction.

Choose a button for each word:

you clearly know the word and would be able to explain its meaning to someone else.

you understand the word's meaning in a sentence but cannot define it out of context.

you recognize the word as a real word, but you don't know anything about its meaning.

you don't know the word at all, or you think it might be a made-up word. Some made-up words are in the list so we can detect random guessing.

undergo neutral rebop
resolve ensure element
novan slimy complement
consult estate formula

Choose a button for each word:

Please provide a single word synonym for each word. If you don't think of any synonyms, leave the field blank.

undergo: experience
neutral: unbiased
element: periodic
estate: resolve: rectify

Review Activities

Select the word that correctly fills in the sentence

The name of the game in diving and surfing is _____. When an object is put in the water, if it displaces less water than the object's volume, the object floats or has positive _____. If the object weighs more than the water displaced by its volume, it sinks or has negative _____.

- bawdy
- panacea
- paucity
- dearth
- sanguine
- buoyancy

Which word is a synonym for (or closely related to) **neutral**?

- divine
- unbiased
- alternative
- complex
- inclined
- stout
- relevant

Write a sentence using the word **lament** below.

An example sentence is **not** a definition. See good example sentence requirements [here](#).

Create Example sentence

Submit Example Sentence for Approval

Which example text can best be completed with the word: **inkling**?

I knew very early on in life that I wanted to be in the arts because of teachers that I had beginning in middle school and continuing through college. I always had an _____ for music, and musical theatre, and through the years developed more and more interest in visual arts.

The old English word "_____," means a wise man, and this term comes from the belief that _____ was thought to impart wisdom and improve one's memory. I can't vouch for my memory improving since planting _____, but I certainly feel wise for buying it that first summer I started growing herbs.

I really want to see the village _____. I see it as a booming little village. We're hoping to get the new subdivision in so we have room for economic growth here. Once we get more homes we'll have a demand for more services. It'll help us to grow.

Here sense and the mysterious ways of government collided. The bill passed with overwhelming support in both houses of the legislature. Then it was _____ by Gov. Reel. The legislature failed to take a vote to override the _____ when it met last month. It appeared that it had the votes but not the will.

... This is important since the success of coaching is based on the relationship between the client and the coach. I feel potential clients that they will have a sense, or an _____ if I am the right person to coach them. If they can follow that _____, then I know they are ready to be coached.

Initial Word Study

Please tell us how well you know the word

logic

I need to study this word

I know it well

Skip this word for now: 200 coins

Pearson Merriam Webster

1logic ˈlɒɡɪk (noun) logic logic logic

- a way of thinking about something that seems correct and reasonable, or a set of sensible reasons for doing something. "There is a certain logic in their choice of architect." 4
- a formal method of reasoning, in which ideas are based on previous ideas
- a set of choices that a computer uses to solve a problem

logic



Because the answer didn't readily come to him, Esteban relied on **logic** to help him solve the math problem.

Pearson Merriam Webster

1logic ˈlɒɡɪk (noun) logic logic logic

- a way of thinking about something that seems correct and reasonable, or a set of sensible reasons for doing something. "There is a certain logic in their choice of architect." 4
- a formal method of reasoning, in which ideas are based on previous ideas
- a set of choices that a computer uses to solve a problem

logic

Such a position is widely held. The problem is that the **logic** is backwards; cause and effect have _____ inverted. Disputes don't cause poverty, unemployment, and crime. To believe otherwise is a failure to understand the depth of the dropout problem and its place in a larger political and economic context.

he more been make

Write a definition of **logic** below in your own words. Your definition will appear on your flashcards.

You must begin with "logic means..." or "logic is..."

Create My definition

Engagement Features

VOTING - Week 6: One Liner Challenge

Write a caption for the image below:

You are allowed one vote, please read all the submissions and vote on your favorite. Voting will close at 11:59pm this Sunday and the winner will be revealed on Monday. Thank you to all who participated!

Submissions

Cubs won the Series Let's all **reconcile** each other with air hugs.

The baseball players were of such high **ebullient** that their winning streak has begun a revolution.

Cubs, who haven't won the World Series in 108 years, played adeptly in Game 7, and won, led on by their **novan** manager, Joe Maddon.

The teammates were enthused upon the realization all of their **paucity** hard work and sacrifices had finally payed off.

Week 6: One Liner Challenge

Write a caption for the image below:

Your caption must include a DictionarySquared word. Submissions will be accepted until **Sunday, 11/13 at 11:59pm Eastern Time**. All submissions will be reviewed for appropriateness. All approved submissions can be voted on by DictionarySquared users next week and the winner will be announced Monday, November 21st.

Look up DictionarySquared words

Submit Caption

Which of the examples below best show the meaning of the word: **relevant**?

Some of these sentences were created by your peers (or you!). Click to rate them in order of best to worst.

- The Rolling Stones' remarkable endurance over the decades shows that rock and roll has grown up. It has its own tradition now, and the Stones embody that tradition, their music is rooted in traditional values, in rhythm and blues and soul music, and it has remained **relevant** while more ephemeral pop fashions have come and gone.
- Consistent with what employees worldwide consider important, cooperation and trust, and relationship with the boss were deemed highly **relevant**. This suggests the need for effective leadership skills. Managers play an important role in retaining employees by first understanding their needs. Keeping lines of communication open is also important in sensing if there are any sources of dissatisfaction or demotivation.
- This is **not relevant** to the topic we are discussing.

Submit Ranking



Watch a video demonstration at: <https://dictionariesquaredresearch.sc.edu>

Pilot Study 1

Method

- Participants were 275 9th grade students, from public schools in South Carolina (11 class sections taught by 4 teachers)
- Pretests were administered in September 2015 (PPVT-4, GMRT-4); posttests in January 2016 (PPVT-4, GMRT-4 Vocabulary, and D² Proximal Assessment)
- Students were assigned to use D² for 30-75 minutes per week for the Fall 2015 semester, as a nominal portion of their Language Arts course grade
- Three teachers reported providing some dedicated class time for students to use the software

Results

- Students' total D² usage time ranged between 0 -1070 minutes (Mean = 111 minutes, SD = 129 minutes),
- Due to a major flood, schools were closed for > 1 week in October. Usage dropped off and did not recover (< 25% of students returned to site after flood).
- Students encountered between 0-889 words on D²(Mean = 87, SD = 112)
- Post-test scores were significantly higher than pretest PPVT-4 ($d = .25, p < .001$) and GMRT-4 ($d = .17, p = .01$).
- Usage time showed a small, but significant correlation with pre-test scores ($r = .18-.20, p < .01$).
- Regression analyses indicated that usage time uniquely predicted PPVT-4 post test scores, after controlling for pre-test scores ($R^2\Delta = .024; p < .001$); usage time did not uniquely predict GMRT-4 Vocabulary Scores or the D² Proximal Assessment after controlling for pre-test scores
- Further analyses with propensity score matching are planned

Pilot Study 2

Method

- Participants were 25 young adults enrolled in a three-week summer "Gateway" course at a private university in Tennessee
- D² Vocabulary Test administered at Pretest, prior to usage, and posttest 18 days after pretest
- Students were assigned to use DictionarySquared 75 minutes per week 3 weeks of summer course as a nominal portion of their course grade
- D² usage occurred both in and out of class

Results

- Students' total usage time varied from 0-182 minutes (Mean = 43.18 minutes, SD = 53.96 minutes)
- Students encountered between 0-115 words on D² (Mean = 24.8, SD = 31.6)
- Post-test scores were significantly higher than pretest ($d = .50, p = .02$)
- Usage time was not significantly correlated with pretest scores ($r = -.15, p = .43$)
- After controlling for pretest scores, usage time explained 34% unique variance in posttest scores ($p < .001$)

General Discussion and Next Steps

- Results of two studies indicate the feasibility of conducting a larger-scale study examining D² effects
- Feedback from students and teachers was generally positive; > 80% of student respondents said D² was an "okay" or "fun" way to learn vocabulary, and > 90% reported that D² was somewhat or very helpful in teaching them vocabulary.
- Stronger evidence of potential efficacy for Study 2 may be related to timing of posttest, consistency of usage across participants, and/or student motivation
- Suggests importance of encouraging sufficient usage during entire intervention period
- No control group in pilot studies; randomized control trial now underway