

Project UD3: Universal Digital Decoding Dictionary

B o o k

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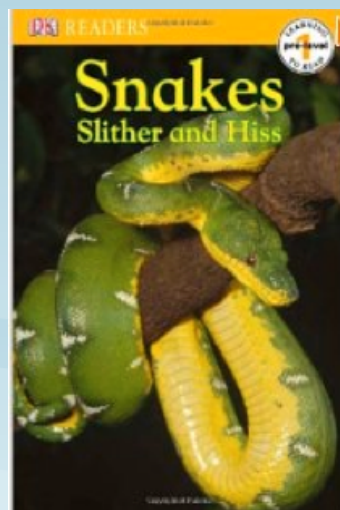
The immediate goal of Project UD3 is to create a Universal Digital Decoding Dictionary that can underlie any text on a digital screen. The long-term goal is nothing less than to transform the way that children learn to read, by coupling this dictionary with practices that encourage children to pursue their personal interests and gain access to information they are curious about through reading. At first glance, the UD3 appears to be simple technology for only the simplest part of reading skill. A closer look reveals that it could revolutionize the way that children learn to read, because of the personalized and highly motivating learning situations the dictionary allows when merged with other technologies.

The Problem: How Can Beginning and Struggling Readers Read What They Really Want To Read Without Getting Frustrated?

There's a catch-22 to early reading. Once past the very beginning of stages of reading, when children have some experience in decoding simple words and single sentences, they need to build their reading skills through massive amounts of practice in "doing" real reading, combining decoding skills with comprehension. But here's the catch: the types of books that early readers can read with minimal or no assistance are often too short and simple to capture children's interest. If children don't have much interest, they'll spend little effort and time on reading and comprehension. On the other hand, books that are interesting enough for early readers to really want to read often have words and sentences that are too complex for them to decode without getting frustrated.

The Solution: Use A Decoding Dictionary That Allows Readers To Self-Teach

Imagine that a first-grader is outside in his yard before school with his father and sees a snake. He's extremely excited when he gets to school and tells his teacher about it. She says, "Wow, I have the *perfect* book for you – it's a story [or a non-fiction book] about snakes!" She gives him a tablet with an e-book on it.



Diana Sharp Consulting

The Current Lack of Decoding Support in E-Books and Other Digital Material Is A Tremendous Missed Opportunity for Self-Teaching

Some of the words are still hard for the boy—after all, he's in first grade and it's tough for authors to write a very compelling story or give much information about snakes with first-grade vocabulary. If the book were in print, the child might get too frustrated and quit reading. But the tablet is tied in to a Universal Digital Decoding Dictionary, so that all the child has to do is touch on a word to see how the letters and sounds go together. For example, he touches on the word "night" and simultaneously sees and hears the word being "sounded out" on the screen:

n igh t.

This type of support differs from what is currently offered today and represents a tremendous missed opportunity for supporting early reading. Many e-books for children advertise a whole-word-based feature of word support, such that children can touch on a word they can't read and hear the whole word pronounced. In addition, the latest iPads offer an accessibility feature called "Speech Selection." When this feature is turned on users can double-tap on any word from any application, e-book, or website on the screen and hear the whole word pronounced by a text-to-speech synthesizer.

Unfortunately, what we know from decades of research in the reading, cognitive neuroscience, and dyslexia fields is that this type of whole-word pronunciation help is of little or no help to many children, particularly those who are most at-risk of reading failure. Why? Because hearing the whole word pronounced does not help many children to see and hear the letter-sound (grapheme-phoneme) structure of the word, pay attention to this structure, and mentally encode the word in a way that will enable them to read it during future encounters.

Finally, for the first time in the history of reading, we have technology that can make the letter-sound structure of words visible (and audible) to beginning readers in a way that paper cannot. We have already begun development on a Universal Digital Decoding Dictionary to work with digital text: any e-book, any website, any e-mail; anything that a beginning reader might want to read.

Project UD3

For The First Time in History, We Have Technology That Can Make The Letter-Sound Structure of Words Visible and Audible To Beginning Readers In A Way That Paper Cannot



The Key Is To Combine Decoding Support With Material That Readers Want to Comprehend

Our vision is that this dictionary will be the key to self-taught reading; when the child comes to a word he cannot read, he can touch the word and instantly see and hear the grapheme-phoneme (letter-sound) structure, “sounded out.”

Often this type of help is all the child needs to figure out the word for himself, and feel proud for doing so. If the child needs more help, he can always touch the word again to see and hear the parts of the word blended together into a whole word. The self-teaching of reading skill that can happen when children have access to this dictionary inside e-books means that a great deal of the boring activities in current reading “programs” in school would become unnecessary, letting teachers focus on motivating students with real books and other material matched to their personal interests.

We have already developed a UD3 of over 4,000 words. These words are drawn from over 100 real books that have been market-tested as books that children enjoy reading, and they range across a number of topics of interest. Many of these books are already in an e-book format and available through iBooks, Nook, or Kindle. Research studies support our estimate that by expanding the dictionary to 20,000 words, we can cover 97% of elementary reading material.

What makes our dictionary so powerful is that it is based on a model drawn from our extensive expertise in reading cognition, reading pedagogy, and linguistics. This type of expertise is unlikely to ever find its way into reading support created by commercial e-book publishers because it is much less expensive to simply provide children with whole-word pronunciation support. Our dictionary, in contrast, provides the support of a world-class reading tutor, available 24/7, tailoring the type of sub-components provided to different types of words and taking into considerations the limitations of a child’s working memory. For words like “night” with five or fewer phonemes, the sub-components provided by the dictionary are individual graphemes and phonemes. For words longer than five phonemes, the sub-components are syllables, which have also been shown to be an effective level of help for longer words compared to whole-word help. For compound words, such “policeman,” our dictionary displays the internal word chunks, rather than the syllables. If a word has meaningful sub-units (morphemes), such as prefixes, suffixes, or plural endings, the dictionary separates out those components and draws the child’s attention to them, in line with research showing that morphemic units play a role in word identification.

Providing children with this type of expert, 24/7 support for self-teaching of reading has never been possible with traditional paper, because paper is silent and static.

There’s no glamorous technology involved: no video, no Skype, no GPS, no accelerometer, no game mechanics, no virtual reality. It may be least-glamorous digital tool for reading ever proposed...But it could revolutionize how children learn to read.

Given the advanced state of technology, the development of this dictionary is clearly overdue.

Extended Consequences...

...For Dyslexia. Research on adults who have overcome dyslexia validates that their success came from massive amounts of reading in an area of intense interest. Research also shows that what dyslexic children need is extensive exposure to and extensive practice with the letter-sound structure of words. This type of practice can re-wire their brains to perceive words in the way that good readers do.

...For Autistic Children. We have already received encouraging reports from parents of children with autism that our prototype dictionary of over 4,000 words (currently available as an iPhone/iPad app called “Reading Machine” that works alongside non-digital books) appears to

engage the interest and raise the word reading skills of autistic children who have experienced failure with many other reading programs, both traditional and software-based.

...For Illiteracy in Third-World Countries. In third-world countries, learning to read is often hampered by additional conditions, including teachers who are absent up to 30% of the school year, chalkboards that are so scratched they are illegible when teachers attempt to show children the letter-sound structure of words, and a pervasive lack of reading material. Many groups, such as *One Laptop Per Child*, and *Worldreader* (a group promoting an e-reading revolution in Africa through the distribution of Kindles), are attempting to use technology to solve these problems, but none of them provide a decoding dictionary that could help users teach themselves to read with the digital material on these devices.

Project UD3

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