

Assessment Specifications and Research Background

Introduction

In response to a growing need to increase the literacy achievement of their students, most schools today have adopted programs that utilize a traditional, teacher-centered, whole-class approach, while others have opted to work with small groups and still others have employed one-on-one tutoring for select students. Prior studies have shown that a variation on the latter approach -- individualized instruction based on diagnostic assessment information -- is an ideal way to prevent reading failure and accelerate the literacy development of low-achieving students (Juel, 1996; Shannahan & Barr, 1995; Wasik & Slavin, 1998, McCallum, et al., 2000). Let's Go Learn's *Diagnostic Online Reading Assessment* and *Unique Reader* instructional programs were created to provide teachers and parents with individualized reading assessment and instruction. The theoretical, pedagogical, and curricular dimensions of the program were based on best practices developed by reading specialists who worked directly with struggling readers in the Cal Reads program at UC Berkeley and who studied under Dr. Richard McCallum, the director of the Advanced Reading and Language Leadership Program at the Graduate School of Education at UC Berkeley.

Although much research has been conducted on the importance of individualized and comprehensive reading instruction, current models of individualized instruction are

traditionally limited to serving only a fraction of the students in need, while the pool of trained professionals necessary to implement these programs is scarce. Let's Go Learn has developed a solution to provide individualized literacy assessment and instruction to all students and a way for teachers to manage each student's reading progress and apply individualized computer-based activities to authentic classroom practices. Let's Go Learn's assessment, *DORA (Diagnostic Online Reading Assessment)*, and individualized online instruction program, *Unique Reader*, were modeled after Cal Reads, a successful program developed by Dr. McCallum at UC Berkeley. In his tutoring program, Dr. McCallum had shown that consistent, individualized reading assessment and instruction could raise literacy skills of struggling readers by approximately two years within a school year compared to a control group of similar students (McCallum et al., 2000). Furthermore, a study examining the effects of the proposed reading program (Learning Today, 2003) on the reading achievement levels of Title 1/Limited English Proficient (LEP) students in Belle Glade, Florida showed significant grade-level gains in their sight words, phonics, vocabulary, and reading comprehension skills after 12 weeks in the program when compared to the grade-level gains of students in a control group.

Diagnostic Online Reading Assessment

Because a single standardized assessment gives only a small picture of a student's reading ability and provides little formative information to guide instructional practices, *DORA* was created with the idea of obtaining information from multiple sources and vantage points to more accurately paint a picture of an individual's reading strategies across multiple measures which follow a constructivist perspective of the reading process (Flores,

et al., 1991). The most effective way to characterize a child's reading ability is to assess his or her reading skills across a set of criterion-referenced categories that are important to the reading process. Modeled after the battery of reading measures used by Cal Reads and reading specialists as outlined in various reading methods books (Gillet & Temple, 1994; Ruddell, 1999), the eight reading skills measured by Let's Go Learn are: 1) High Frequency Words, 2) Phonemic Awareness, 3) Phonics, 4) Word Recognition, 5) Vocabulary, 6) Spelling, 7) Silent Reading Comprehension, and 8) Fluency.

High Frequency Words Sub-test: This sub-test assesses children's ability to automatically recognize words that have been identified as frequently occurring in books, newspapers, and other forms of text. This sub-test uses words from Edward B. Fry's 300 sight words as test items which have been broken down into three general levels of difficulty (Fry, Kress, & Fountoukidis, 2004). A child's response time in identifying these sight words is recorded and factored into the scoring of the child's performance on the assessment.

Phonemic Awareness: According to Ruddell (1998), by the time children are between three and four years old, they have learned most of the approximately 40 phonemes (discrete sounds in words) which comprise the English language. The ability to hear and manipulate these discrete sounds in spoken words is referred to as "phonemic awareness." Children demonstrate their phonemic awareness by segmenting words into individual sounds (i.e., /fish/ into /f/-/i/-/sh/), deleting sounds in words, blending sounds, adding sounds, or substituting sounds in one word to make a new word. Children who have good phonemic awareness can often recognize/decode words and spell/write better. Some research has indicated that phonemic awareness is one of the best predictors of

reading success (Stanovich, 1993-1994). Others further argue that phonemic awareness is the prerequisite and consequence of learning to read (Yopp, 1992). As such, it is especially important to determine children's level of phonemic awareness in the primary grades to ensure that they get the necessary phonemic awareness intervention as early readers, lest they struggle with reading as young adults.

In the phonemic awareness sub-test, children are presented with a number of audio and picture-only items and asked to manipulate the sounds in these items to produce a new word. Specific phonemic awareness categories tested include: 1) addition, 2) deletion, 3) substitution, 4) identification, 5) categorization, 6) blending, 7) segmenting, 8) isolation, and 9) rhyming.

Phonics: In addition to having an awareness of the discrete sounds in words, it is important that children have a mastery of how sounds and words are represented in English. This is important because children need to be able to effortlessly decode and recognize familiar and unfamiliar words to help facilitate the process of negotiating the meaning behind the text (Adams, 1990; Snow, Burns, & Griffin, 1998). The phonics sub-test assesses a child's ability to recognize basic English phonetic principles of high utility (Pressley & Woloshyn, 1995). These phonetic principles include: 1) beginning sounds, 2) short vowel sounds, 3) blends, 4) the silent E rule, 5) consonant digraphs, 6) vowel digraphs, 7) r-controlled vowels, 8) diphthongs, and 9) syllabification.

Word Recognition: As in many informal reading inventories like the Qualitative Reading Inventory (Leslie & Caldwell, 1994), the Basic Reading Inventory (Johns, 2001) and the Diagnostic Assessment of Reading (Roswell & Chall, 1992), *DORA's* Word Recognition sub-test assesses a learner's ability to recognize leveled lists of words. In this

sub-test, children are presented with a number of increasingly difficult words until they reach a level at which they “frustrate” or stop recognizing the words presented to them. The final outcome of the assessment gives teachers an idea of the grade-level ability of a child to recognize words out of context. This assessment is important in identifying how well an individual can use what he or she knows about text to recognize words not in the context of a sentence and of increasing difficulty.

Vocabulary: A learner’s knowledge of words and what they mean is an important part of the reading process, as knowledge of word meanings affects the extent to which the learner comprehends what he or she reads (National Reading Panel, 2000). The vocabulary sub-test assesses a child’s understanding of words. The words from this sub-test were selected by teachers and reading specialists to reflect the types of words children learn in various disciplines in different grade levels and in various stages of their lives. Similar to the Peabody Picture Vocabulary Test (Dunn, 1959), in the vocabulary sub-test children are asked to select the picture which correctly corresponds to a word they hear. The program continues to present children with increasingly difficult words until they make a certain number of errors. This sub-test provides information about a child’s level of oral vocabulary.

Spelling: The process of spelling involves a number of cognitive processes. While each person uses different strategies for spelling words, these strategies usually have in common a familiarity with a particular word (i.e., familiarity with its meaning and visual exposure to the word), letter-sound matching, and confirmation of how the word “looks” (Bear et al., 2000; Ruddell, 1999; Gillet & Temple 1994). Because spelling is also a generative process (as opposed to a decoding and meaning-making process in

reading), it is natural for young readers' spelling abilities to lag a few months behind their reading abilities. *DORA*'s Spelling sub-test tries to capture the nuances of the different processes children use to spell words by employing target words with increasing difficulty in different domains. In the process of creating the items for the *DORA* Spelling sub-test, reading specialists created a list of recommended target spelling words by examining words commonly encountered in or taught at particular grade levels. The difficulty of the recommended words changes in these general domains in the following ways: 1) number of syllables in a word, 2) regular phonetic patterns within the words, 3) irregular phonetic patterns within the words, 4) vocabulary level, and 5) a child's expected familiarity with a word based on his or her grade level. In the first through third grade spelling lists, for instance, while most of the words are phonetically regular, the number of syllables increases with each grade level and the phonetic patterns within each word become increasingly difficult. The way the difficulty increases per grade level varies. Studies of how students perform on the spelling test have been used to eliminate words that are too easy or too difficult for a particular grade level, resulting in a test that possesses the ability to better distinguish students who spell well on one list of words as opposed to another.

This sub-test is important in providing insight about a learner's orthography skills-- that is, a learner's ability to take what he or she knows about letters and sounds and represent them in words and ability to represent words with irregular spelling patterns. This sub-test measures a child's conventional spelling ability as well as provides teachers with information about the errors their students make. The program invites children to correctly spell a series of words that becomes increasingly difficult. The program stops administering

words when a child consistently spells words incorrectly. Items from this sub-test were chosen by reading specialists and classroom teachers to approximate the kinds of words children of a particular age would see in their classroom instruction.

Silent Reading Comprehension: The silent reading comprehension sub-test forms the crux of *DORA*, which attempts to provide a window into the semantic domain of a learner's reading abilities. The content of each silent reading passage is expository and written to reflect the subject areas that students of a particular grade level would encounter. In a variation on protocols for some informal reading inventories (Gillet & Temple, 1994; Leslie & Caldwell, 1994), children silently read passages of increasing difficulty and answer questions about each passage immediately after they read it. The questions for each passage are broken up into four factual questions, one inferential question, and one contextual vocabulary question. The program stops administering passages and questions once a student misses a certain number of questions on a passage. It provides teachers with information about a child's comprehension level. For complete technical specifications on the leveled passages, please see Appendix A: Silent Reading Design Specifications and Appendix B: Grade Level Justifications and Parallels.

Fluency: In this sub-test, children read aloud to teachers short leveled passages with increasing syntactic complexity. Teachers time children's reading of these passages and record their errors and prosody (voice inflection, articulation, and versification) according to a pre-established rubric adapted from the National Assessment of Educational Progress (NAEP) Oral Reading Fluency Scale (1995).

Teachers enter children's raw reading time, number of errors, and prosody scores into a web interface. *DORA* calculates children's reading rate and automatically incorporates the inputted scores into the Let's Go Learn online score management system. Fluency is included as a teacher-administered measure. After administering the fluency assessment, teachers enter the scores into Let's Go Learn's online score management and storage system.

Analyzing *DORA* Sub-tests: Reports and Instructional Connections

After a child completes an assessment, teachers can immediately retrieve a report which details his or her reading profile in a quantitative and qualitative fashion and provides important instructional recommendations specific to that child's reading profile.

There are multiple components of a teacher's report on a child's reading assessment. The first section includes a quantitative summary of the child's performance on each of the sub-tests. In this section of the report, areas of low performance are flagged to make teachers aware that that particular reading skill is of high priority to that particular child. The next section of the report includes a qualitative summary of the child's reading profile which is broken up into three sections: 1) Graphophonic Strategies, 2) Semantic and Syntactic Strategies, and 3) Overall Summary. According to Adams (1998), learners attend to letter/sound (graphophonic), meaning-based (semantic), and language-based (syntactic) cues as they read, sometimes relying more heavily on one cue than on another as they draw from their background knowledge. The three domains (graphophonic, semantic, and syntactic) are used to analyze each learner's reading profile and to extrapolate, via the results of *DORA*'s sub-tests, each child's strengths and weaknesses and the strategies he or

she uses when encountering text. The graphophonic section characterizes a child's attention to letter and sound cues in words. This includes his or her ability to recognize words by sight, application of phonics principles, and ability to distinguish sounds within words. The semantic and syntactic section analyzes the child's ability to attend to meaning and language-based cues. The overall summary explains the child's strengths and weaknesses in utilizing all three strategies--graphophonic, semantic, and syntactic--to decode and make sense of what he or she reads. Each section uses evidence from the sub-tests listed above to qualify the profile made of the student's reading abilities, including scores and, where appropriate, a description of the child's errors relative to the target item.

The third section of the report is a summary of different kinds of instructional strategies in the three domains (graphophonic, semantic, and syntactic) which would best accelerate the child's reading development. The instructional strategies draw from the child's successes and known abilities to help build the areas of weakness identified by *DORA*. The last section of the report provides other detailed instructional strategies and tips in teaching reading that would be helpful to all students in the classroom.

To facilitate the use of reading assessment information in meaningful and formative ways, Let's Go Learn's *DORA* provides teachers with an online management system. This online management system allows teachers to sort assessment information in order to group children with similar profiles, monitor individual and classroom progress, and quickly view individual assessment summaries. The online management system assists teachers in their various instructional decisions, including grouping and selecting appropriate reading activities and materials.

All of the sub-tests, except for the fluency sub-test, are conducted online with little teacher mediation. With *DORA*, a teacher has the capability of assessing her whole classroom in one trip to the school's computer laboratory. Unlike other assessments, which often require multiple teachers, reading specialists, or elaborate management setups for a period of weeks to assess individual students, *DORA* provides individualized, diagnostic, and comprehensive reading assessments coupled with a powerful data management and reporting system that helps teachers make appropriate instructional decisions for their classrooms and provides progress information on every child.

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Appendix A

Silent Reading Leveled Passages

Design Specifications

Fact v. Fiction

The Let's Go Learn silent reading passages are all non-fiction passages, an intentional design choice. When students are taught to read in the primary grades, they are often taught using primarily fictional passages, in which a more predictable story structure and vocabulary can support them as they master word identification skills. Roughly at the beginning of fourth grade, instruction begins to focus more heavily on reading for the sake of learning new factual information. Often this transition takes place quite suddenly when students are asked to read content area textbooks in addition to stories. Many of the self-extending strategies that children develop for comprehending narrative text are less useful in approaching non-fiction, and additional new strategies are needed to help them make sense of non-fiction passages. Yet students often do not receive explicit instruction in how to read non-fiction. As a result, reading performance may show a sudden, marked "decline" at the point of transition to non-fiction text, when in fact what has significantly and abruptly changed is the nature of the task demands.

DORA is structured to avoid this trap by using only factual passages and no fiction. The reasons for choosing non-fiction over fiction, even at the lower grade levels, are twofold. First, we believe that children should have opportunities to encounter non-

fiction (and to learn the relevant strategies for unpacking it) from early on in school; we reject the simplistic notion that “reading to learn” should begin only at the intermediate grade levels.

Our second reason for selecting non-fiction over fiction passages is that assessment results for non-fiction passages are generally a more conservative measure of comprehension. While a student who excels in reading fiction may have much greater difficulty with non-fiction passages, it is far more rare to encounter a student whose non-fiction reading level is higher than her/his fiction reading level. Assessing a child on a fiction passage could result in a misleadingly high score that masks areas where the child would benefit from additional opportunities and support for her/his reading development. By using non-fiction passages, Let’s Go Learn is able to provide a score that – while it may be lower than what the child could do on fiction passages – offers diagnostic information about the child’s reading ability on the type of material that he or she may encounter most in further schooling and in “real life.”

Topics

The *DORA* silent reading passages draw on material set out in the California content standards. Passages for each grade level are based on selected topics from the social studies, fine arts, and science standards for that grade level. The topics were chosen for multiple reasons. First, the topics were narrowed from a list of possible choices to those likely to be of greatest interest to students near that grade level. Second,

the topics were chosen that would most likely be part of all schools' curriculum for that grade level; obscure topics that might not be addressed in detail were eliminated. Finally, topics were chosen that were not so obscure that children near that grade level would be unlikely to have sufficient background knowledge to be able to make sense of the passages.

Stylistic Design

Passages are written in a journalistic format. The passages stylistically most resemble a newspaper or encyclopedia article in format. They begin with an introductory paragraph that presents the main idea of the passage, often in a manner designed to get the reader's attention--for example, via a leading question or a reference to common phrases or occurrences.

The rest of each passage is written in organized, sequential paragraphs. There is not a concluding summative paragraph on most passages as such paragraphs are not typical in this genre. The style is designed to be as similar to textbook or authentic informational writing as possible.

Comprehension Questions

The *DORA* comprehension sub-test provides information both on students' knowledge acquisition through what they read *and* on students' ability to analyze and apply that knowledge in a variety of ways. The questions are divided into two main

categories: factual questions and higher-level, extending questions. Questions that are factual require the student to report on information that was explicitly stated in the text. Extending questions require students to take information from the text and apply it--to their own lives, to other things they know about the world, or in order to draw conclusions.

In most classrooms, the majority of questions asked about a reading passage are factual. This may be adequate for assessing simple comprehension of sentences, but in order to assess students' deeper comprehension of text, higher-level questioning strategies must be employed.¹ *DORA* looks at both dimensions in order to provide a more complete assessment of a student's comprehension.

Each passage is followed by 6 questions. Three of these are factual questions, which assess knowledge acquisition on a basic level – can the student read and obtain information from an informational passage? There are also three extending questions.

One of these extending questions requires the student to define a vocabulary word from the text. Since words are selected that are unlikely to be within most children's active or passive vocabulary at the targeted grade level, these questions assess a student's ability to find a meaning for an unfamiliar word in the context of the passage. This is considered an extending question because it not only requires students to use knowledge from the text, but it also requires them to draw on previous word knowledge in order to draw conclusions.

The final two questions are extending questions that require students to do one of several tasks. They might ask a student to answer “how” or “why” questions about facts

¹ For more information about authentic questioning strategies, please reference Robert Ruddell's *Becoming an Influential Teacher*.

in the text; they might ask students to apply the facts to their own lives or experiences; or they might ask students to think of similar situations to those described in the text.

All *DORA* comprehension questions are designed to assess the students' understanding of the passage in a way that does not confound their comprehension with their knowledge of language arts terminology such as "main idea" or "simile." Assessments that rely on such terms are substantially dependent on students' understandings of the terms themselves and thus function more as vocabulary assessments than as assessments of comprehension. A student may be able to identify the main idea of a passage without knowing that it is called a "main idea." Or a child may be able to summarize brilliantly when asked "What was this passage about?" but be shut down and flummoxed by a question that asks for a "summary." By avoiding questions that rely on knowledge of language arts jargon, *DORA* questions avoid inaccurate comprehension scores that are likely when the student understands a passage well but does not know the terminology. We minimize the use of jargon in order to provide a less filtered, more pure assessment of the underlying comprehension.

Appendix B

Grade Level Justifications and Parallels

LGL Silent Reading Leveled Passages

The Let's Go Learn silent reading passages (versions A-C as of 9/2007) are evaluated across several different categories to ensure that the results of testing remain the same, regardless of which passage is used. Attached is a spreadsheet detailing exact data ranges for all categories that are considered during passage leveling.

Passage grade leveling is dependent on several different factors, including passage length, sentence length, sentence complexity, and vocabulary. There are several different measures and standards available for leveling. Let's Go Learn employs the Flesh-Kincaid leveling system, modified with considerations for sentence complexity and vocabulary. If a leveling system such as Flesh-Kincaid is used exclusively, it does not take into account whether the level is determined based more on vocabulary or more on sentence complexity (as F-K levels use both). A fourth grade passage that is level 4.0 because of vocabulary is very different from a passage that is level 4.0 because of sentence structure. By using F-K to obtain a numerical value and then aligning passages to Let's Go Learn standards using a variety of data points, it is assured that the passages are consistent in terms of both vocabulary and structure across each grade level *and* from one grade level to the next. The data point score ranges are kept narrow, and further passages are leveled into the already-established score ranges.

Passage Length and Paragraphing

The length of *DORA* silent reading passages increases steadily as the level increases. First grade passages begin at 100-125 words per passage (wpp) and increase by 25-50 wpp per grade, to as many as 395-415 WPP at the 12th grade level. By not dipping below 100 wpp, even at the first grade level, the passage is long enough to provide detailed miscue analysis. Another concern for length is test exhaustion: passages more than 500 words long could lead to assessment data reflecting test exhaustion rather than ability (especially if a student must read multiple passages).

Paragraph length also increases because of increases in sentence length and complexity. The number of sentences per passage (spp) also increases slowly by grade level (12-20 at first grade; 28-30 by seventh grade), until the seventh grade level, at which time the rate of spp begins to decrease as the complexity of sentences markedly increases.

Sentence Length and Complexity

The length of sentences per passage (spp) increases steadily as the grade level increases. At the first grade level, the average sentence length ranges from 6.5 – 8.5 words per sentence (wps). By the seventh grade level, the average has increased to 12.1-14.7 wps. At the twelfth grade level, the average sentence length has increased to 20.8-21.8 wps.

Along with sentence length, sentence complexity is also considered. Data is taken for each passage to show the percentage of simple, compound, complex, and compound-complex sentences. The percentage of simple sentences per passage declines steadily as the percentage of other varieties of sentences increases. While compound sentences are slightly harder to read, complex sentences increase difficulty even more as they complicate independent clauses with a dependent clause variable.

At the first grade level, the percentage of simple sentences ranges from 82-85%, with only 5-12% compound sentences and 2-12% complex sentences. There are no compound-complex sentences at the first grade level. By the seventh grade level, the percentage of simple sentences has decreased to 64-79%, with 0-15% compound sentences and 7-32% complex sentences. At the seventh grade level 0-4% of the sentences may be compound-complex. Finally, by the twelfth grade level, the range of simple sentences is 21-68% (a slightly larger range, due to the overall complexity of writing at this level), with 5-32% compound sentences and 16-37% complex sentences. At this level there may be as many as 5-16% compound-complex sentences. As evidenced by these examples, the overall range of simple sentences declines substantially while the range of compound sentences increases slightly, and the range of complex and compound-complex sentences increases noticeably.

Other considerations in the complexity of sentence structure are the rate of prepositional phrases per sentence and the rate of verbals (gerunds, infinitives, and participles) per sentence. Prepositional phrases increase the difficulty of a sentence by adding information that could have been presented in its own independent clause as a phrase attached to an independent clause. The rate of prepositional phrases per sentences

increases steadily by grade level as well. At the first grade level the average number of prepositional phrases per sentence is 0.2-0.6 per sentence. By seventh grade that rate has increased to 0.85-1.9 prepositional phrases per sentence. Finally, by the twelfth grade, the average increases to 2.2-2.6 prepositional phrases per sentence, an overall increase of 2 phrases per sentence from the first grade.

Verbals increase sentence difficulty by presenting a verb in the position of a noun or adjective. This often confuses students--who are used to seeing these words as the actions in the sentence--and may create comprehension problems for those students who actively use syntactical cues when reading. The rate of verbals per sentence also increases gradually (as verbals in general are not used with the frequency of other grammatical structures, like prepositional phrases). At the first grade level, the rate of verbals per sentence is very low, only 0.05-0.25 verbals per sentence. At the seventh grade level, the average has risen slightly to 0.5-0.6 verbals per sentence. By the twelfth grade the average is 0.58-0.84 verbals per sentence.

Vocabulary

One large concern when leveling passages is the complexity of vocabulary. This becomes even more of an issue when writing non-fiction passages as of course, there are terms that must be introduced that are specific to each topic. These elements of specialized vocabulary can complicate a leveling system, as they often increase the reading level dramatically. The LGL silent reading passages continue to use terminology and specialized vocabulary in the leveled passages but complement these more

complicated, unfamiliar terms with other, easier vocabulary, thus keeping the leveling patterns consistent for each grade level, regardless of the specialized vocabulary.

That being said, the difficulty of vocabulary overall can be understood by looking at the average number of syllables per word (spw). This range increases steadily by grade level also. At the first grade level, there are few polysyllabic words (only 10-20%), and the average number of syllables is only 1.1-1.2 spw. By the seventh grade, the number of polysyllabic words has increased (now 31-35%), and the average number of syllables has increased to 1.4-1.5 spw. Finally, by the twelfth grade level, polysyllabic words are commonplace (35-45%), and the average number of syllables is 1.56-1.73 spw.

The introduction of polysyllabic words of more than 3 syllables is also an indication of vocabulary complexity. Two-syllable words only increase in frequency until roughly the sixth grade level, at which point the rate becomes more consistent, as more polysyllabic words of 3 syllables or higher increases. Four-syllable and 5-syllable words are not introduced in the text with any notable frequency until between grades 5 and 7. At that time, their use is minimal and increases only slightly until the twelfth grade (where their rates are 3-6% and 1-2%, respectively). In general, as the grade level of the passage increases, the number of single-syllable words decreases, and the number of more complex polysyllabic words increases.