The Lexile® Framework as an Approach for Reading Measurement and Success

By Colleen Lennon and Hal Burdick

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Overview

The Lexile® Framework for Reading is an innovative approach to reading measurement that can be implemented by educators, parents and readers of all ages. Lexile® measures, as components of the Lexile scale, are the result of more than 30 years of ongoing research based on well-established predictors of how difficult a text is to comprehend. By measuring both text difficulty and reader ability on the same scale, readers can be appropriately matched with books that will be both engaging and challenging.

Lexile measures are the most widely adopted reading measures in use today. Over 450 publishers have submitted works to be measured, and more than 100 million articles, books and websites have been measured. In addition, most major standardized reading assessments and many popular instructional reading programs report Lexile reader measures. Implementation of the Lexile Framework can lead to reading success and improved reading enjoyment at all levels of proficiency.

The Lexile Framework for Reading

The Lexile Framework for Reading is a scientific, proven approach to reading and text measurement. A Lexile measure is the numeric representation of a reader's ability or a text's difficulty, both followed by an "L" (for Lexile measure). The Lexile scale is a developmental scale for reading ranging from beginning reader measures (measures below 0L on the Lexile scale denoted by a BR prefix to the measure, e.g. BR100L) to above 1600L for advanced text. All Lexile Framework products, tools and services rely on the Lexile measure and scale to identify the Lexile levels of both the reader and text. When a reader and text are appropriately matched, the reader enjoys a comprehension rate of about 75 percent. The 75 percent comprehension level corresponds to that balance of skill and difficulty that allows reading to be a positive, but adequately challenging, experience and encourages the reader to grow in proficiency and motivation. A unique feature of the Lexile Framework is that both student ability and text difficulty are measured on the same scale in the same units. The Lexile Framework provides a distinctive approach for matching readers with texts based on the following assumptions:

- Texts can be ordered according to the difficulty each presents for a reader.
- Readers can be assessed according to the success each will have with any particular text.

The Lexile Framework determines a Lexile reader measure for the student and Lexile text measure for the reading material, which can then be compared to match a reader with appropriate text. After this basic comparison, it is possible to adjust the reader's expected comprehension of the reading material by taking other factors into account, such as the particular reader, text and context. By placing readers and texts on the same scale, Lexile measures allow readers to make consistent and accurate book selection judgments. They assure that every reader can select books that are based on reading ability, yielding successful individualized reading experiences.

Determining Lexile Measures

Lexile measures are based on two factors: Word frequency and sentence length, which are more formally called *semantic difficulty and syntactic complexity*. Both of these factors, over decades of research, have been shown to be excellent predictors of how difficult a text is to comprehend. The relationship of these two factors within a text contributes to the Lexile measure for that text.

Semantic Difficulty

For the developing reader, new words are difficult when first encountered in print. As the reader encounters the same word again and again, that word becomes more familiar. Early reading researchers determined that the difficulty of words is a continuum based on exposure, with frequently encountered words being the easiest and rare words the most difficult.

Researchers at MetaMetrics® analyzed more than 50 semantic variables to determine which were the most valid indicators of text difficulty. The mean log word frequency, which is the logarithm of the number of times a word appears in each 5 million words of a corpus of nearly 600 million words, had the highest correlation with text difficulty ($r = -0.779$). This is the measurement used to determine the semantic difficulty of text in the Lexile system. It should be noted that word frequency is not the number of times a word appears in a specific passage, but the frequency of the word in the corpus of nearly 600-million words that is employed by the Lexile® Analyzer (see "Measuring Text", page 4 for an explanation of the Lexile Analyzer).

Syntactic Complexity

Reading researchers have found that the best predictor of the difficulty of a sentence is its length. Long sentences are likely to contain more clauses, and therefore communicate not only more information and ideas, but also an interrelationship between them. Researchers also speculate that longer sentences require the reader to retain more information in short-term memory. Sentence length is a powerful indicator of the syntactic complexity of a passage.

The Lexile Framework works by combining the measurements of word frequency and sentence length for any passage into an algebraic equation. This equation is called the Lexile specification equation and reflects both the semantic and syntactic difficulty of a passage. This equation can also be used to place reading comprehension test items on the same measurement scale so that tests and reading test scores can be reported as the Lexile metric as well.

Measuring Text

The Lexile Analyzer is the engine that powers the Lexile Framework. It is a software program designed to evaluate the reading demand, or text complexity, of books and test items. This process is referred to as measuring, and the result is a text measure that represents the difficulty of analyzed text. The Lexile Analyzer measures text by breaking down the entire piece and studying its characteristics, such as sentence length and word frequency, which represent the syntactic and semantic challenges that a text presents to a reader. The outcome is the reading difficulty, expressed as a Lexile measure, along with information on the word count, mean sentence length and mean log frequency.

Table 1. *Example of the output generated by the Lexile Analyzer*

Title	Author	Lexile Measure	Word Count	MSL	MLF
Harry Potter and the Sorcerer's Stone	Rowling, J.K.	880L	76896	11.94	3.25185

Above is the Lexile Analyzer output for "Harry Potter and the Sorcerer's Stone." MSL represents Mean Sentence Length, and MLF represents Mean Log Word Frequency.

Longer sentence lengths and words of lower frequency lead to higher Lexile measures; shorter sentence lengths and words of high frequency lead to lower Lexile measures. Text such as lists, recipes, poetry and song lyrics are not analyzed because they lack conventional punctuation. The Lexile Analyzer will "read" a section of unpunctuated text as one long sentence which could, depending on the overall length of the text, profoundly affect the accuracy of the Lexile measure of the entire piece.

During the calibration process, the Lexile Analyzer extracts slices from the text. A slice is a piece of text containing a minimum of 125 words. If the 125th word falls within a sentence, the Lexile Analyzer continues adding words until it finds the sentence-ending punctuation (i.e., period, question mark, exclamation mark or semicolon). A slice is used when analyzing books, periodicals, textbooks and other large bodies of text.

Consider a piece of text that is 250 words long. The first 125 words consist of five long sentences of 25 words each. The second 125 words consist of 25 short sentences of five words each. If this text were analyzed as a whole, the second 125 words would have an impact of five times the first 125 words in estimating the mean sentence length for the text. Analyzed separately, the first set of 125 words is recognized for its long sentence length, and generates a high Lexile measure. The second set of 125 words is recognized for its short sentences and receives a low Lexile measure. When the calibrations for these two slices are combined, the Lexile measure is higher than if the full 250 words were analyzed as one piece. Thus, breaking the text into slices allows for the most accurate Lexile measure of a complete body of text.

Special Text Measurement Cases

Lexile text measures are based solely on semantic difficulty and syntactic complexity. When determining the Lexile measure of a text that was designed for emergent, early and transitional readers (generally below 200L), other characteristics of the text must also be considered.

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Fiction Picture Books

The reading process for young readers is often scaffolded to enhance comprehension of the material. Scaffolding allows less able readers to read more difficult text. One method of scaffolding is to include illustrations that support the text in telling the story. Since the reader has two modes of receiving the information – text and illustration – students may be able to read more difficult books that provide the scaffolding necessary to overcome the difficult text. Therefore, when calibrating the Lexile measure of a fiction picture book that has direct and explicit picture support for the text, 120L is subtracted from the initial Lexile measure of the text based on the semantic and syntactic features of the text. The final Lexile measure of a text reflects any modifications made for special text cases.

Nonfiction Books with Fewer than 500 Words

Books with fewer than 500 words are often designed for emergent readers. These books are often written in a style that is not found elsewhere – considerable repetition of words and/or phrases, long sentences that include definitions (almost a dictionary format) and pronunciation cues of new and/or difficult vocabulary. When calibrating the Lexile measure of a nonfiction book with fewer than 500 words and written for emergent readers, 120L is subtracted from the initial Lexile measure of the text based on the semantic and syntactic features of the text. The final Lexile measure of a text reflects any modifications made for special text cases.

Measuring Readers

There are a number of ways to determine a Lexile measure for a reader. Most major standardized reading tests used in schools report their results as a Lexile measure. Many schools now have computer adaptive reading assessment tools that can also be used to determine student Lexile measures.

One example is the *Scholastic Reading Inventory*™ (SRI), a standardized assessment designed to measure how well students read literature and expository texts of varying difficulties. SRI began as a targeted-level pencil-and-paper test, but is now available in a computer-adaptive test format. Each item consists of a passage that is response-illustrated (a statement is added at the passage with a missing word or phrase followed by four options, or distractors).

Table two is an example of an SRI reading assessment question, along with the set of data that exists for that question. The data provides information on:

- each item's theoretical difficulty (how difficult it is expected to be).
- each item's observed difficulty (how difficult the item actually was when administered to students).
- the quality of the item (expressed as the point biserial, or a percent of 1).
- the percent of students who chose the correct answer (P-value).
- the grade in which the question was administered.
- the total number of students who responded to the question.
- the number of students who chose each of the four distractors.

"The First Men in the Moon," by H. G. Wells
In addition to my belief in my powers as a business man, I had always in those days had an idea that I was equal to writing a very good play. It is not, I believe, a very uncommon persuasion. I knew there was nothing a man can do outside legitimate business transactions that has such opulent possibilities, and very probably that biased my opinion. I had, indeed, got into the habit of regarding the unwritten drama as a convenient little reserve put by for a rainy day. That rainy day had com. **I wanted to be a(n)_____.**
A. author
B. doctor
C. actor
D. singer

Item Statistics for "The First Men in the Moon," by H. G. Wells	
Theoretical Calibration	1110L
Observed Difficulty	1134L
Point biserial	0.43
P-Value	0.76
Grade Administered	8
N	18,808
Responses Distractor A	14,272
Responses Distractor B	703
Responses Distractor C	3403
Responses Distractor D	430

Excerpt from "The First Men in the Moon" by H. G. Wells

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A student takes a test of about 25 of these items. Using a psychometric model (a scientific model that helps measure psychological factors that can't be observed directly, only indirectly based on a student's responses) called the Rasch model, a correspondence table of the number of items the student got correct, or raw score, is generated for each list. This score can then be converted into the Lexile metric.

The Rasch model is conjoint measurement model, which means two elements can be measured on the same scale in the same units. In the case of the Lexile Framework, these elements are text difficulty and reader ability. The reported Lexile measure is an estimate of the student's true reading ability or level. Variability in measures can occur over time from various factors, such as the student's health and well-being, or the conditions in which the test is taken. The typical amount of variability, or what psychometricians call 'error', is about 70L for any given test administration. Multiple measures will reduce this error and are encouraged for a more precise measurement.

The student's Lexile measure marks the level of text a student can read with 75 percent anticipated comprehension. This 75 percent rule corresponds to the student's instructional reading level, or the level at which the student can successfully navigate the material with the use of context clues and other comprehension strategies to fill in the gaps.

The student's Lexile measure establishes his or her Lexile range, which extends roughly 50L above to 100L below the student's reported measure on the Lexile scale. Considering a 1000L student as an example, he or she would have a reading range of between 900L to 1050L. If the student attempts material above 1050L, the level of challenge may exceed the reader's ability to construct meaning from the text. Likewise, material below 900L will provide that student with little comprehension challenge. Teachers can guide students to reading materials within this range, adjusting difficulty to compensate for the challenges or opportunities the particular reading opportunity provides. Other factors also contribute to comprehension, such as motivation, background knowledge and scaffolding. These factors can reduce or increase the reading demand of a particular text.

Using Lexile Measures to Manage Comprehension

Targeting the reader requires understanding of his or her Lexile range, specifically, what students can achieve under different circumstances. The Lexile Framework incorporates various tools and strategies to connect learners of all ages with resources at the right level of challenge.

The Lexile Map

The Lexile® Map (www. Lexile.com) is our graphic depiction of the Lexile scale. The Lexile Map provides examples of popular books and sample texts that are matched to various points on the Lexile scale. The examples on the map help to define text complexity and help readers identify books of different levels of text complexity. Both literature and informational texts are presented on the Lexile Map. The Lexile Map displays only a portion of the scale. The Lexile scale extends below 200L for early readers and early reader texts to above 1600L for more advanced readers and texts. Students can use the Lexile map to get a sense of their reading level in terms of books they are familiar with.

Adjustments for the Reader

The Lexile Framework gives teachers a quick and accurate way to determine which texts are likely to be within a student's basic range of comprehension and allows them to adjust for the interests, experience and background of the student. Teachers can use Lexile measures to guide a struggling student toward texts at the lower end of the student's Lexile range. Similarly, advanced students can be adequately challenged by reading texts at the midpoint of their Lexile range, or slightly above. Challenging new topics or genres may be approached in the same manner.

Reader-focused adjustment also relates to the student's motivation and purpose. If a student is highly motivated for a particular reading task (e.g., self-selected free reading), the teacher may suggest books higher in the student's Lexile range. If the student is less motivated or intimidated by a reading task, material at the lower end of his or her Lexile range can provide the basic comprehension support to keep the student from feeling overwhelmed.

Adjustments for the Text

The Lexile Framework provides teachers a way to use their awareness of the challenge and fears that the new reader faces to adjust the difficulty of assigned texts. When students confront new kinds of texts, the introduction can be softened and made less intimidating by guiding the student to easier reading. On the other hand, students who are comfortable with a particular genre or format can be challenged with more complex texts, which will help to prevent boredom and promote improvement in vocabulary and comprehension skills.

Adjustments for Context

Similarly, the Lexile Framework can be used to adjust difficulty levels for challenges provided by environmental pressures, such as the varying expectations of free, storybook reading versus reading done for study or research purposes. Adjustments can also be made for reading required for a major assignment or to pass an important exam.

One important way that Lexile measures enhance the educational environment is by allowing a student's Lexile range to be communicated without the stigma often attached to grade-level assessments. Teachers and students can set goals for reading achievement using numbers that apply equally well to the student and the text; parents can receive reading lists and other support materials that help them encourage their children's development.

How the Lexile Framework is Unique

The Lexile Framework differs from other methods of measuring reader ability and text difficulty, as well as managing reading comprehension in the following ways:

- The Lexile metric is instrument-independent. This means that any standardized test could potentially report reading scores along the Lexile scale, and in fact, many already do. A student who takes the *TerraNova*® (CTB/McGraw-Hill Publishing Company) one year could take The Iowa Assessments™ (published by the Riverside Publishing Company)

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the following year in a different state and still receive an accurate Lexile measure that reflects his or her reading-comprehension change over the year. In addition to tests, a wide variety of instructional software and book and article publishers have adopted Lexile measures. States and districts are not limited to a single provider of tests or instructional materials. A list of tests that report Lexile measures can be found at www. Lexile.com.

- The Lexile Framework is unique in matching reader ability to text difficulty on the same scale using the same method, ensuring accuracy and allowing for individualized monitoring progress.

- A student's Lexile measure is more than a test score. It applies to books and articles that a student encounters daily – at school, at home and in the library – creating a strong school home connection.

Conclusion

By providing a common metric that can be applied to both text difficulty and reading ability – a common metric that has more precision and less potential stigma than grade-equivalent leveling – the Lexile Framework offers educators a flexible and easy-to-use tool to help target students with texts that present the optimal degree of reading challenge. In addition, the accuracy and flexibility of the Lexile Framework makes it an excellent way to communicate reading goals and achievements with students, families and other educators.

About The Lexile Framework for Reading

The Lexile Framework for Reading (www.Lexile.com) provides a common scale for matching reader ability and text difficulty, allowing easy monitoring of progress. Lexile measures give teachers and parents the confidence to choose materials which will improve student reading skills across the curriculum and at home. More than 100 million books, articles and websites have Lexile text measures, and all major standardized tests can report Lexile reader measures for students. As the most widely adopted reading metric in use today, Lexile measures are part of reading and testing programs at district, state and federal levels. The Lexile Framework was developed by MetaMetrics, an educational research organization based in Durham, N.C., after 15 years of research funded by Small Business Innovation Research (SBIR) grants through the National Institutes of Health.

References

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