

Running head: ASSESSING READABILITY

Assessing Readability  
in Information Design  
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## **Abstract**

Readability, a reader's ability to understand text and pictures, is a complex process that deserves the respect and attention of every information designer. Numerous instruments have been devised over time to determine the appropriateness of various materials, but all have areas of controversy and should be used in conjunction with other methods.

These areas of controversy are discussed in the context of various popular readability indexes, and implications for clear communication are presented. Finally, practical guidelines are offered to the information designer.

## Assessing Readability in Information Design

In today's information-rich world, readability is a primary concern in information design. As good information designers know, the true purpose of any message is to communicate clearly to the target audience who will receive the information. Before this can happen, designers must understand what readability is, its relative importance to understanding messages, what factors affect it, and how to deal with those factors.

### Defining Readability

To begin a constructive dialog, key terminology must be defined. When addressing the issue of readability, the term will be defined as “the reader's ability to understand the text and the pictures” (Pettersson, 2002). This includes all content, how it is presented, and the reader's motivation toward receiving the information (Pettersson, 2002).

This definition excludes issues of legibility, which are not concerned with how well the reader can interpret the information, but how well the receiver can actually view the information physically. This includes the size and boldness of words and images, contrast between information and (back)ground, color choices, and more (Pettersson, 2002).

While both these factors are very important to clear communication, this paper will deal exclusively with readability and the reader's ability to understand the intended message.

### The Importance of Readability

Researchers have tried for decades to determine the best method for assessing readability in numerous texts. Chall and Dale, two widely-known researchers, suggested that this began to take place in the 1920s, due in large part to two factors: (1) publication of Thorndike's *Teacher's Word Book*, and (2) the extension of education for large parts of the population beyond the elementary school level. Thorndike's book contained a word frequency list that first made it possible to measure difficulty in text.

The older age of the student population in higher levels of education made it more important to measure difficulty (Kotula, 2003).

Certainly, student concerns continue to drive these efforts. Thomas Gunning, author of one of the most popular assessment instruments, suggests that there is nothing more important for instructors than to supply their students with materials that are appropriate to their level of difficulty (Gunning, 2003).

Yet, there are other more pressing concerns surrounding readability. Illiteracy is a major concern in the United States and other countries around the world. The U.S. Department of Education's National Center for Education Statistics estimates that 21% of the population over 16 years old reads at or below the 5<sup>th</sup> grade level, with an additional 25% being at no more than 8<sup>th</sup> grade level (NCES, 1992). Older non-student populations also have need of understandable information. People literally are dying because they are unable to decipher the information presented in various publications to assist them with their safety or medical issues.

For example, motor vehicle collisions were the cause of 46% "of all injury-related deaths among children aged 1 to 14" (U.S.) in 1998 (NCHS, 2000). The largest risk factor has been the improper installation and use of restraints in the vehicles. Alarming, up to 94% of these restraints are mishandled, with difficult instructions being cited as the cause. In a readability assessment, it was determined that these instruction sets ranged in difficulty from 7<sup>th</sup> to 12<sup>th</sup> grades, with a mean of 10.34 (Wegner, 2003). Statistically, this is well beyond the reading capability of up to 46% of the U.S. population above 16 years old.

Similarly, Judy Singh (2003) discovered that educational materials for cancer patients ranged from grades 9 to 15, with a mean of 12.1. Given the literacy statistics, this is also beyond the capability of many patients. Clearly, the stakes are high. So how does one reconcile the need with the method?

## **Readability Assessments**

Over the past 80 years, hundreds of readability indexes have been devised to assess difficulty of reading materials. Fewer than a dozen remain in popular use today. Many readability factors have been

considered, including word length, sentence length, vocabulary difficulty, syllables per word, proper nouns, dependent clauses, prepositional phrases, word frequency, and so on (Gunning, 2003). Most of these factors have been dismissed because of differing views on their validity. For example, there are many examples of multi- or poly-syllabic words that are more easily understood than single-syllable words. Consider “commonplace” versus “trite.”

Still, some strides have been made. Most formulas today consider only two factors: vocabulary difficulty and sentence length (Gunning, 2003).

Vocabulary looks at which words are appropriate to specific age groups, taking into account the difficulty of the word, as well as the past experience and knowledge of the student. One of the most popular (hand-calculated) formulas today is the Fry Readability Graph. Although it uses sentence length and number of syllables in a word, it assumes that syllables equate to word (or vocabulary) difficulty. (See Figure 1 below.) Fry found this easier than comparing words in text with established vocabulary word lists, such as the popular Dale-Chall list (Gunning, 2003).

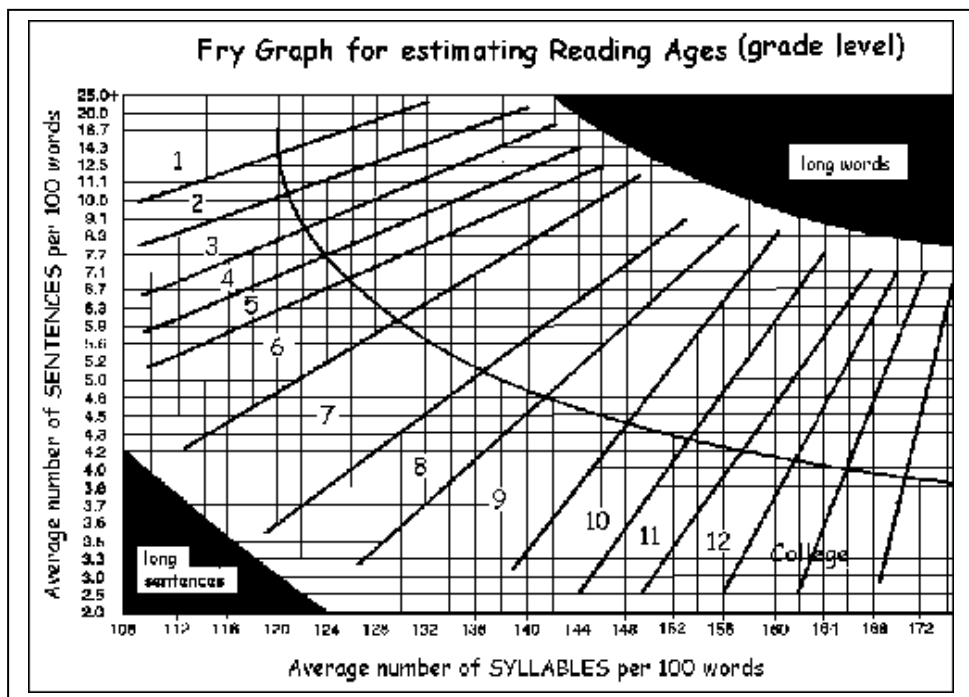


Figure 1. Fry Readability Graph. The graph helps determine grade level by using three 100-word passages from a text. Plotting the average number of sentences and average number of syllables per 100-words determines grade level. If level varies significantly between passages, more text can be used (Fry, 1977).

Sentence length also plays a key role in that shorter sentences tend to be very simple, and longer sentences tend to become complex and contain more clauses to be interpreted. Short, simple sentences are always used in lower grade-level reading materials (Gunning, 2003).

Another popular formula, the Flesch-Kincaid syllable formula, takes advantage of computer technology to determine grade level and difficulty of text. It is bundled into Microsoft Word and other popular word processing packages. In fact, this text was checked for level of difficulty, and results can be viewed in Figure 2.

### Matching Readers to Appropriate Materials

While these assessment instruments go a long way in helping educators choose appropriate materials for their audiences, they are certainly not without their problems.

According to Dr. Steven Stahl, other factors must play a role, as well (2003). Stahl suggests that there is a strong correlation between the words that we know and the readability of various texts. Determining what a “difficult word” is can be problematic. As previously mentioned, some short, one-syllable words can

be more difficult than longer words. Moreover, words used frequently in texts can be learned more quickly through familiarity and repetition; words with prefixes and suffixes are often recognizable, despite their length; idioms and slang create problems for children and immigrants (though measured as simple); specialized knowledge areas carry their own terminology; and many English words have numerous meanings (Stahl, 2003).

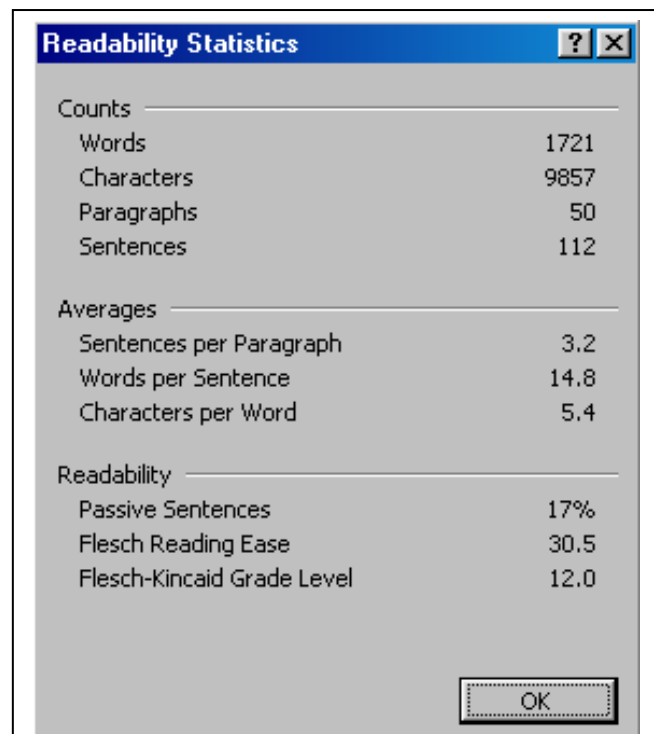


Figure 2. Flesch-Kincaid Readability Statistics. This assessment shows the reading level and other statistics for this text (Assessing Readability in Information Design).

Stahl suggests that difficulty can also be based on a reader's specific interests in the material. Research has suggested that students are quite capable of reading well above their specified grade level – if the material is personally interesting. For example, high school students may be interested in cars. They are likely to have a fair amount of knowledge on the topic, and they may read advanced level publications about them. They have a frame of reference that allows them to understand the subject with relative ease. Conversely, merely rewriting texts with easier words does not necessarily improve comprehension. Vocabulary must be linked with prior knowledge, sophistication, and interest in the material in order to improve understanding (Stahl, 2003).

This proves especially problematic for both students and adults with language learning disabilities and/or dyslexia. Even if a reading specialist can find material at the correct institutional level, there may be great disparity in interest level. Older students and adults often become frustrated with materials intended for young children (Kotula, 2003).

### **Practical Guidelines for Matching Readers with Appropriate Materials**

Clearly, matching readers with appropriate materials is a complex process. Assessment instruments can play a valuable role in the decision-making process – but it cannot end there. Information designers must carefully consider their audiences' ages, interests, level of sophistication, previous knowledge, and disabilities.

This can be accomplished in a number of ways, including (but not limited to):

- Interview members of the target audience, if possible. Ask them what they currently read and what interests them. Informally assess the level of sophistication.
- Look at other publications that have been assimilated successfully within the same audience.
- Use the Fry Readability Graph or other popular instruments to determine readability of finished text.

- Keep text and pictures as simple as possible for the given subject matter. Even sophisticated readers will be comfortable with material that is slightly simpler than their capability allows.
- Test completed materials on a small number of people in the target audience. Adjust as necessary.

These are a few simple ways to increase the possibilities for success. Others currently exist and more will be discovered over time. The information designer should stay abreast of the latest research and be ever diligent to offer appropriate materials to audiences everywhere who are navigating a confusing world of information.

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