READABILITY MEASURES FOR THE CLASSROOM TEACHER

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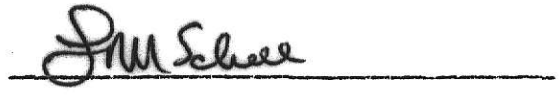


TABLE OF CONTENTS

LIST OF FIGURES

Table

Chart

INTRODUCTION

The basic tool for learning in schools is the ability to read. The teacher has to match child and reading material for successful reading. One of the most common means of finding suitable reading material for a pupil is teacher judgment. The teacher uses what is known about the child and the material to pick suitable reading material. In the early 1920s extensive research began in the field of readability, and readability formulas were introduced as a way to measure readability or difficulty of material. There have been many (over 90) studies done on readability since the 1920s, and there are many formulas and ways to measure the readability of material.

Dale and Chall (6:23) have suggested a comprehensive definition of readability:

> In the broadest sense, readability, is the sum total (including interactions) of all those elements within a given piece of printed material that affects the success a group of readers have with it. The success to which they understand it, read it at an optimum speed, and find it interesting.

The formulas and measures of readability have been widely used by librarians, editors, publishers and researchers, but because of the time involved in using the formulas, unfamiliarity of mathematics involved in working the multiple variable linear equation formulas (Grade Level = $\_\_X_1 + \_\_X_2 + \_\_\_$), unfamiliarity of ideas and terms (i.e., cloze procedure), and the quantity of research, these formulas and measures have not been widely used by classroom teachers.

Reading is a multi-dimensional and multi-purposeful activity, as shown by the many definitions, teaching methods, and ways of evaluating progress. There are also many ways to measure readability. Teachers expect pupils to read many different kinds of material in many situations. The purpose of this paper is to find several easy to apply and reliable measures of readability that can be used by the classroom teacher in many different reading situations.

INFLUENTIAL FACTORS AND APPROACHES TO READABILITY MEASUREMENT

The measurement of "the sum total of all those elements within a given piece of printed material" is another matter. In an early study to determine the factors of readability, Gray and Leary (9) polled opinions of what makes a book readable from librarians, publishers, and teachers. In general, it was agreed that the most important factors were content, style, organization and format (16). The readability formulas and research to develop them have been done on one factor, style. The formulas were developed by combining the most significant factors in predicting the criteria. The McCall-Crabbs Standard Test Lesson, first published in 1925, was a set of graded reading passages and became the most used and available criterion for development of the formulas. The basis of grade levels comes mainly from this criterion measure. So, readability in this context means ease of reading or comprehensibility of material. It is generally agreed that the most influential factors of readability, in this context, are average sentence length, average number of simple sentences, percentage of different words in selection, number of prepositional phrases, number of polysyllabic words, and number of adjectives, adverbs, personal pronouns, and other human relations

words (9). All these can be divided into two general categories, word difficulty or sentence difficulty, which are the two most highly correlated factors in all available research. When using these factors in a multiple variable linear equation, easy material would have short sentences, large number of common and monosyllabic words, and many personal references; difficult material would contain long, complex sentences, many uncommon and polysyllabic words, and few personal references. However, there are many different formulas and each factor is measured differently depending on the formula used. The Dale-Chall formula has as its factors sentence length and percent of non-Dale words; the Flesch Reading Ease uses sentence length and syllables per 100 words as factors.

There are some other very important factors that enter into readability of material. The measurement of content, organization and format is difficult, if not impossible, quantitatively (9). A few researchers have tried to put human interest into a formula, but these attempts have offered no high correlations in prediction (4).

Another measure of readability that at the present time seems to represent a broader look at the interplay of the factors the formulas omit is the cloze procedure. The formula method of measuring readability measures vocabulary load, but the cloze procedure measures vocabulary and, just as important, the concept load of a selection (15). The cloze procedure measures the language patterns of the writer against the language patterns of the reader; this includes the factors of organization, content, format, and style. Because the cloze procedure involves the reader, it is able to draw from his experience, interests, feelings, motivation, language patterns, needs and reading conditions. Since the

reader is involved in the evaluation of difficulty of material, it is a measure of the factor human interest.

Research is still pursuing factors of readability and their quantitative measurement.

TABLE I

Some Readability Measures

Formula or Technique	Factors	Applicability
Dale-Chall Formula	1. Percentage of words outside the Dale list of 3,000 2. Average sentence length in words	Grades 3-12
Flesch Formula		Grades 4-12
Reading Ease	1. Number of syllables per 100 words 2. Average number of words per sentence	
Human Interest	1. Number of personal words per 100 words 2. Number of personal sentences per 100 sentences	
Cloze Technique	1. Language pattern of writer against what reader expects 2. Subtle variations in word meaning 3. Dependencies between words, sentences, and paragraphs	Any level

OVERVIEW OF FINDINGS

Dale-Chall

Gray and Leary (9) began with 44 factors of readability, but a later study on the Gray and Leary elements by Stolurow and Newman (9) ended with 23 measurable factors in two major groups: relative difficulty of words and relative difficulty of sentences. Their findings have been borne out by later research; the most highly predictive Dale-Chall formula uses these two factors in a multiple variable linear equation formula.

Powers, Sumner, and Kearl (9) in 1950 did a recalculation study on four well-known adult formulas. They used 383 prose passages as their criterion. The multiple correlation coefficients were .71 for the Dale-Chall, .64 for the Flesch Reading Ease, .59 for the Gunning, and .58 for the Far-Jenkins-Paterson formula. This indicates that the Dale-Chall formula is the best predictor using a word list and Flesch Reading Ease is the best predictor not using a word list.

Dunlap (9:129) did another study of many types of readability formulas on eighth grade pupils and their comprehension of 24 hundred-word samples from Davey Crockett. Her criterion was ten questions after each passage which she called the "Direct Comprehension Check" (D.C.C.). The formulas she applied were Beal and Boder, Dale-Chall, Flesch 1943 and 1950, Gray-Leary Long and Short formulas, Johnson, Kessler, and Lorge 1939 and 1948. Her conclusions were as follows:

1. The book, Davey Crockett, was found to be too difficult for eighth grade pupils by the D.C.C.
2. Formula ratings for the total book ranged through easy, fairly easy, average, sixth grade, seventh grade, to 8.6 by 1943 Flesch formula, and 10.1 by the Dale-Chall formula.

3. The Dale-Chall formula was the only one which gave a rating for the book comparable to the D.C.C. rankings. The 1948 Flesch formula was one of the easiest to apply and also ranked samples adequately in comparison with the D.C.C. rankings.
4. The 1943 and 1948 Flesch, 1939 Lorge, Dale-Chall, and Kessler measures gave higher correlations than the other techniques when ranking of passages was compared to the D.C.C. ranking.
5. The findings, plus the writer's evaluation based on application of the measures, indicated that the Dale-Chall, 1948 Flesch, 1939 Lorge, and Kessler techniques were the most practical and reliable for the materials used in the study.

Klare (9) states that for children's materials the use of a formula developed specifically on children's reading material should perhaps be used. This book was published in 1959, and since then charts and graphs extending the Dale-Chall formula down to the primary levels have been developed.

Research indicates that even with the Dale-Chall formula, a highly predictive one, a teacher can only predict readability of material within a grade level (4). Powers, Summer and Kearl in their recalculation study found that on 113 hundred-word passages the standard error in grade level for the Dale-Chall formula was .54 grade, while it was .78 using the original 1948 formula.

Flesch

Flesch found another way to measure readability in formula form. He is the only researcher that has used human interest in a formula. Flesch felt there were several deficiencies in the formulas developed, and tried to remedy their shortcomings. He thought that vocabulary was emphasized at the expense of other important factors, abstract words and sentence length. In 1948 Flesch revised his older formula which, like other formulas, used the McCall-Crabbs Standard Test Lesson as its

criterion with a human interest scale. This scale doesn't measure readability, just the interest the selection has, based on a personal word and personal sentence count. The human interest score has a range of 0 (Dull) to 100 (Dramatic).

Reading comprehension at the elementary level is based on perception and understanding of words; above the fifth grade, it is based on the relationships between ideas. Vocabulary is just one of the factors of difficulty at the upper levels. Flesch's formula does predict difficulty at adult levels, but cannot be used in predicting reading material in the lower elementary grades (4) (9).

Margaret Peterson (9) compared the Flesch formula scores with a reading comprehension test which was based on Reader's Digest articles. She found that the Flesch formula did predict the difficulty of popular adult reading material.

In a controlled split-run experiment, Swanson (9) found increased reading speed, or readership, to be related to increased readability. Merritt Ludwig (9) rewrote articles which were in Wallaces Farmer into easy and hard versions for a study of readership and readability. The easy version had a Flesch score of 82 and the hard version had a score of 60. The low interest or hard version had a human interest score of 30 and the high interest or easy version had a score of 72. This difference in human interest didn't seem to make much difference on readership, and Ludwig concluded that when interest in the subject matter of the selection is high, hard words and human interest have less effect on readership.

Klare draws some conclusions from the comparative studies that he looked at. These are that the Dale-Chall and Flesch Reading Ease

formulas provide the most consistent results of correlation to criteria and grade placement data, and more of the high intercorrelations involved the Dale-Chall scores than any other formula.

Newer Formulas

In the past five years two new formulas, the FOG by Fry (7) and the SMOG by McLaughlin (12), have been developed. These formulas are very easy and quick to apply to reading material.

SMOG. McLaughlin (12:640) says that previous investigators "overlooked the fact that semantic and syntactic difficulty interact." Gunning found that by counting the polysyllabic words a measure of semantic difficulty could be derived. McLaughlin's formula, based on this, is a polysyllabic word count. His criterion was complete comprehension of the McCall-Crabbs Test Lesson questions at the end of each test lesson. He felt that this was a more meaningful standard than 50% or 75% correct answers of those questions. In the study in which he tries four formulas he has made for predictability, the most accurate formula, SMOG Grade = 3 + square root of polysyllabic word count, had a correlational coefficient of .99 with the criterion, and a standard error of prediction of 1.5 grades. This is less accurate than the multiple variable linear equation formulas, but McLaughlin goes on to state that these formulas have correction tables that are arbitrary and they also have somewhat different criteria.

FOG. The Fry formula FOG has two factors, average sentence length and aggregate number of syllables in the sample. His formula uses a graph to find readability of materials from his two factors. In his report, "A Readability Formula That Saves Time," (7) he brings up the

problem of validity. Because grade designations are loose, standardized tests in determining reading grade level of material and children change depending on what test is used. Fry used a relative ranking technique to validate his formula to see whether his formula could predict as well as the Dale-Chall, Flesch, SRA, and Botel formulas. His graph formula correlated .94 with the Dale-Chall, .96 with the Flesch, .98 with the SRA, and .78 with the Botel. Fry felt that the Botel formula ignored sentence structure complexities, and this might account for a lower correlational coefficient. It can be said that the FOG formula ranks about as well as the Dale-Chall, Flesch, and SRA formulas.

A comparative study done by Pauk (13) on the Fry, McLaughlin, and Dale-Chall formulas to find the advantages of new over old formulas found that in more than half the cases the FOG was identical to the Dale-Chall and that in the other cases there was only a variance of one or two grade levels, but the SMOG had wide variance when compared to the Dale-Chall. The SMOG formula does have different criteria from either the FOG or Dale-Chall formulas, and this may account for the wide variance in correlational coefficients.

Charts and Graphs

Robert Williams (18:158) states that "the recent activity has been to construct 'shortcut' tables or charts which facilitate the use of older readability formulas or to develop simpler and quicker readability formulas. Yet for all the recent activity, the Dale-Chall formula (1948) continues to be favored." It has been proved to be a reasonably accurate measure of readability (8) (9) (13). Seeing this preference for the Dale-Chall formula, Williams constructed a table that certainly facilitates the use of the Dale-Chall formula. It is based on a revision done

by Powers, Sumner, and Kearl. The factors are counted in the samples and then the numbers are looked up on the table and at the intersection is the grade level of the reading material. These tables and charts extend the Dale-Chall formula down into the primary levels.

Cloze Technique

In a search for a more sensitive measure of readability, one that takes in the individual and the complexities of language, Wilson Taylor (17) used the cloze procedure. The term cloze comes from closure, and was studied in the field of psychology in the late 1880s. Taylor applied this technique to measure readability in 1953.

Closure in psychology refers to the human tendency to complete a familiar but not quite finished pattern. An example is to "see" a broken circle as a whole by mentally closing the gap. Taylor found that the same principle applies to language because language is a pattern, and most of the language patterns we use are familiar to us.

Taylor (17:416) defined a "cloze unit as any single occurrence of a successful attempt to reproduce a part deleted from a 'message' by deciding from the context that remains what the missing part should be." The cloze procedure is the deletion of words from the language pattern, and the "receiver" tries to fill in the missing parts. Each deletion is a cloze unit. Taylor, in his initial study, felt that this procedure took in the elements of readability that the formulas ignored, i.e., a subject's knowledge of the topic, non-idiomatic uses of common words, nonsense combinations of words, awkward and confusing sentence structure or pronouns without definite antecedents. The cloze procedure measures the language pattern of the writer of material against what the reader

expects. The language patterns are the so-called "common denominator" of communication.

Taylor found that the cloze procedure ranked three reading passages the same as the Dale-Chall and Flesch formulas. He also found that a deletion (cloze unit) every fifth word is the most efficient measure of readability of material.

Ramanauskas (14) found that the cloze procedure, in contrast to the traditional readability formulas, is sensitive to linguistic constraints (dependencies) between sentences over segments longer than a sentence. The traditional readability formulas just take into account the working of linguistic variables within sentences. She found that when the cloze procedure is used with sentences from a passage in their natural order, subjects scored better than when the sentences were put in random order. So there are "constraints" working between sentences that help us cue meaning from language patterns. The more difficult a piece of written material is, the more constraints it has between its sentences and paragraphs.

Interpretation of Cloze. Until recently the classroom teacher was unable to interpret the scores made on the cloze procedure against any other criteria. There was no way one could place a specific value on the passage. The teacher was unable to compare the cloze score with anything familiar. Bormuth (3) established comparable comprehension scores, stating that a person who gets 38% correct on a closure test usually gets a raw score of 75% on a multiple-choice comprehension test over the same passage, or a corrected score of 67%. The corrected score takes into account the fact that a child has guessed correctly on a certain percent of the multiple-choice test items. He has computed a

table that changes percent of cloze score to what percent would have been made on a multiple-choice test over the same passage: the table goes from 19% cloze score which is equal to 50% raw multiple-choice score or 32% corrected, to 57% cloze score which is equal to 100% raw and corrected multiple-choice score. The instructional level could be 38% or 43% cloze depending on which criterion the teacher used. If a more strict criterion is wanted, the teacher should use the corrected score.

USES OF READABILITY

The readability measures are not the panacea to picking material for specific children. However, if they are used within their limits they can become a tool and aid for the teacher that could greatly help in making the reading activities of a child more successful. These limitations deal with the readability measure and the results. The measure must not be used outside its applicability. If a formula has been developed specifically on certain kinds and levels of materials, it would not be wise to use it outside these limits. In the same respect, using a formula to pinpoint a grade level of a book for a specific child would be using the results of a measure outside its limits.

A formula by its very name is an evaluation of material. The formulas could help in selecting books that generally could be read at grade level by average readers. Committees selecting textbooks for purchase in the content fields could use the formula in making decisions about texts. In the past many of the textbooks published in the content fields, such as social studies for the upper grades, have been technical and dull. The Flesch, using human interest as an important factor in readability, could be used in determining interest of these texts.

The cloze procedure includes material and reader interaction in evaluation. Cloze is a more specific measure of readability level because the child is involved in determining the difficulty of a selection. A teacher could use the cloze procedure in matching child and books, but this needs further research and use in the classroom.

Cloze can be said to measure comprehension because to "read" a deletion the reader must comprehend the words around it. Bormuth (3) suggests this might be a valuable teaching tool for teachers to help "word callers" comprehend what they are reading, and promote better language patterns in the classroom.

Brual (1) found that the cloze procedure is capable of measuring readability of material in the primary grades. Taylor has used the cloze procedure in successfully ranking high school reading material and material in foreign languages.

The readability measures to be of best use must be kept in perspective. Harris (10:207) suggests some steps in evaluating a book that puts the readability measure in proper perspective in that it must be supplemented by the following:

1. Observe the format. Is the size attractive? Is the book approachable and appealing? Is the type legible? Are the illustrations clear, appropriate and understandable?
2. Note the literary form. Will it function for the student's purpose? Is it a form that he likes to read?
3. Read the book slowly for content. Do the ideas fit the student's background and experience? Are they sound? Will they add anything to the basic aims of the course? Is the scope of treatment appropriate for the student's needs?
4. Observe the author's style. Does he write lucidly, freely, and logically? Does he write directly to an audience? Does he write in a popular or technical vein?
5. Predict the difficulty of the book by taking sample passages, analyzing them for significant elements, and applying formula of prediction. Does it rank "easy," "average," or "hard"? If "hard," does the "hardness"

lie in difficulty of appeal, or some other elements? Can the "hardness" be overcome by high degree of student interest, by pointed teaching, or by some other means?

6. Bring together all the facts about the book and relate them to all the facts known about the reader to determine whether the book is suited to his interest, abilities and purpose.

LIMITATIONS OF READABILITY MEASURES

The readability measures do have limitations and to be of best use these measures and their limitations must be recognized. The major limitations cited in the literature seem to be as follows:

Formulas

1. Measure only one aspect of readability
2. Predict wide range of readability
3. Time involved in application
4. Criterion differences among formulas
5. Not sensitive to subtle variations in meanings
6. Can evaluate only material for which it was developed

Cloze

1. Use in classroom based on study that compares multiple-choice test scores to cloze scores
2. Unfamiliarity of terms and principles
3. Newer method, not as much research, as has been done on formulas

Formulas

The formulas measure only one aspect of written material, style, and furthermore, only one part of style, difficulty. These readability formulas are a statistical device, a one dimensional look at written material, and they are imperfect predictors of readability. Even with

the Dale-Chall formula a teacher can only predict readability of material within a grade level, i.e., the formulas predict only a range of readability, not a precise point within the grade.

Because there is no pupil involvement in using a readability formula, there is no input from the child's word recognition or word pronunciation ability. The scope of the readability formula is narrow compared with the range that readability measurement encompasses, i.e., the human interaction with material.

In some cases, vocabulary load is an imperfect predictor of concept load in a selection. In general, the idea that difficult vocabulary means difficult concepts is acceptable, but there are some cases in which vocabulary load cannot be used as a measure of concept load. The author Hemingway is a good example. His vocabulary load is very easy. The Dale-Chall ranked The Old Man and The Sea at the 2.2 grade level. However, this is certainly not indicative of Hemingway's concept load. The concepts and ideas he wrote about are certainly not applicable to second graders.

Many classroom teachers do not have the time to spend working these formulas on written material, and the mathematics involved in working the multiple variable linear equation formulas may be unfamiliar. To use the formulas a teacher must select passages, count words and, in some cases, refer to word lists. It took me three hours to apply the Dale-Chall formula to a book.

In the many studies done to develop readability formulas as acceptable predictors, the criteria of readability level were different. Some researchers used 50% criterion, while others used a 75% criterion on questions over the passage read. In some cases an acceptable number

of questions answered correctly after reading a selection was 50%, while in others a stricter one of 75% was used, and McLaughlin used a 100% criterion for the SMOG formula. The size of the samples varied greatly, from 100 to 1,000 or more words. Many of the formulas were based on vocabulary lists that may or may not be accurate measures of what words are familiar or unfamiliar to children today. Readability formulas are not sensitive to subtle variations in meaning and much of the nature of difficulty of material depends on what the reader expects out of it. Some formulas were developed on specific kinds of reading materials, and can evaluate only the kinds of written material on which they were developed with any degree of accuracy. The individual child, his experiences, feelings and interaction with the material is not included in a formula.

Cloze

The cloze procedure also has some limitations teachers should be cognizant of. The only way of relating cloze to accepted standards is a table that compares cloze scores to approximate scores that would have been made on a multiple-choice test. This is something that needs further research and use. There are probably many classroom teachers that are unfamiliar with the ideas and terms involved in the cloze procedure. The research on the cloze procedure has not been as extensive as it has on the readability formulas, and many of the research projects have suffered from lack of focus of skills being measured, weak experimental design, crude measurement gains, and omissions in reporting the research, such as which kind of cloze procedure was used. As with the readability formulas, there are different variations of the cloze

procedure, and some of the variations have not been fully researched as to how effectively they serve as predictors of difficulty of material. Some researchers have deleted every fifth word, every tenth word, or have deleted nouns, pronouns, adjectives, adverbs on a percentage basis. There are differences in scoring of a cloze measure, such as exact duplication of the deleted word, or synonyms of the deleted word. Multiple-choice cloze measures have also been used with a choice of words for every deletion. The time involved for a whole class to do the cloze procedure and for the teacher to grade them might deter use. Also, if a teacher were wanting to get a general readability of material during a summer vacation, it would not be possible.

No method of finding readability, formula or cloze procedure, is without limitations, and to be used in the correct way these limitations must be recognized.

RECOMMENDATIONS

As indicated in the introduction, reading is a multi-dimensional activity, and the situations in which the readability measures will be used vary greatly. My recommendations as to the kinds of readability measures that are easy and reliable to use are as follows:

1. Use the Dale-Chall formula whenever time permits; accuracy and precision are important. It does have a table and chart to facilitate use that extends into the primary grades.
2. Use the Flesch Reading Ease and Human Interest Scale in upper grades to pick texts for content fields. Many of these texts are too technical and dull, and this would be a way to find interest levels of these texts.

3. Use the FOG formula by Fry if one needs the readability of material quickly and easily. It is based primarily on the same criteria as the Dale-Chall formula, is worked out on a graph, and extends down to the first grade level.
4. Use the cloze procedure if the children are present. It measures not only the material, but reader interaction with material.
5. Use a formula and cloze procedure in combination, whenever time permits, as a cross-check.

Because of the great variety of reading activities and the fact that every individual differs, a combination of readability measures should be used if possible, always keeping in mind the limitations of readability measurement and then using the measure accordingly. When these measures are used outside their bounds, they are no longer reliable measures of difficulty of reading material.

CONCLUSION

If reading material for children is too difficult, learning from reading will not occur. Frustration and a general dislike for reading can occur if a child has not been successful because material has been too difficult. A quick and sure way of judging a book or selection generally suitable for a class, and more specifically for a child, is to use a readability measure.

The readability measure used should depend on the situation in which the teacher finds herself and her classroom of children. One measure of readability has not been developed and to assume that a formula or the cloze procedure is an absolute, final measure of readability level

of material is mistaken. But a knowledgeable teacher, one who understands the principles and limitations involved in readability measurement, can help children discover and use books easy enough to master but difficult enough to challenge. Harris (10) suggests some steps that include observing the format of the book, reading the book for content, noticing the literary form and style, and then using a readability measure and bringing all known facts about the child and the material together.

Even though children are in the same grade, there is great variation in development on every grade level. There are extremes on both ends of the developmental spectrum. Teachers have to be able to help in the middle, but also provide appropriate material for the extremes. Using a readability measure or a combination of these can help the teacher in the difficult job of picking suitable and challenging reading material.

LITERATURE CITED

1. Anderson, Jonathan, "Research in Readability for the Classroom," Journal of Reading, 8: 402-405, 1965.

2. Betts, Emmett A., "Readability: Its Application to the Elementary School," Journal of Educational Research, 42: 438-459, 1949.

3. Bormuth, John, "Comparable Cloze and Multiple-Choice Test Scores," Journal of Reading, 10: 291-299, 1967.

4. Chall, Jeanne S., Readability: An Appraisal of Research and Application. Columbus, Ohio: Ohio State University, 1958.

5. Dale, Edgar and Chall, Jeanne, "A Formula for Predicting Readability," Educational Research Bulletin, 27: 11-20, 1948.

6. Dale, Edgar and Chall, Jeanne, "The Concept of Readability," Elementary English, 26: 19-26, 1949.

7. Fry, E. A., "A Readability Formula That Saves Time," The Journal of Reading, 11: 7, 1968.

8. Kearl, Bryant, "A Closer Look at Readability Formulas," Journalism Quarterly, 25: 344-348, 1948.

9. Klare, George, The Measurement of Readability. Ames, Iowa: University Press, 1963.

10. Koenke, Karl, "Another Practical Note on Readability Formulas," Journal of Reading, 15: 203-213, 1971.

11. Maginnis, G. R., "The Readability Graph and Informal Reading Inventories," The Reading Teacher, 22: 517-518, 559, 1969.

12. McLaughlin, G. Harry, "SMOG Grading--A New Readability Formula," Journal of Reading, 12: 639-646, 1969.

13. Pauk, Walter, "A Practical Note on Readability Formulas," Journal of Reading, 13: 207-210, 1969.

14. Ramanauskas, Sigita, "The Responsiveness of Cloze Readability Measures to Linguistic Variables Operating Over Segments of Text Longer Than a Sentence," Reading Research Quarterly, 8: 72-88, 1972.

15. Robinson, R. D., "The Use of the Cloze Procedure As an Instructional Technique," Reading Quarterly, 5: 19-24, 1972.

16. Scranton, M., "SMOG Grading: A Readability Formula by G. Harry McLaughlin," Master's Report. Manhattan, Kansas: Kansas State University, 1970.

17. Taylor, Wilson, "Cloze Procedure: A New Tool for Measuring Readability," Journalism Quarterly, 30: 415-433, 1953.

18. Williams, Robert, "A Table for Rapid Determination of Revised Dale-Chall Readability Scores," The Reading Teacher, 26: 158-165, 1972.

ADDITIONAL BIBLIOGRAPHY

1. Bormuth, John, Chairman, Readability in 1968. National Council of Teachers of English, 1968.

2. Botel, Morton, Botel Predicting Readability Levels. Chicago, Illinois: Follette Publishing Company, 1962.

3. Culhane, Joseph W., "Cloze Procedures and Comprehension," The Reading Teacher, 23: 410-413, 1970.

4. Flesch, Rudolph, "A New Readability Yardstick." Journal of Applied Psychology, 32: 221-223, 1948.

5. _____, The Art of Readable Writing. New York, New York: Harper & Brothers, 1949, pp. 213-216.

6. Geyer, J. R. and Corey, A. R., "Predicting and Improving Comprehensibility of Social Studies Materials: The Role of Cloze Procedure and Readability Adjustment," Reading World: The Journal of the College Reading Association, 12: 85-93, 1972.

7. Harris, A. J., How to Increase Reading Ability. New York, New York: David McKay Co., 1968, 1970, p. 461.

8. McCall, William A. and Crabbs, Lelah, Standard Test Lessons in Reading. New York, New York: Columbia University Teachers College, 1926, 1961.

9. Johnson, Roger E. and Vardian, Eileen B., "Reading, Readability and Social Studies." The Reading Teacher, 26: 483-489, 1973.

10. Washburne, C. and Morphett, M., "Grade Placement of Children's Books," Elementary School Journal, 38: 355-369, 1938.

Appendix A

The Dale-Chall Formula, Tables and Charts

Dale-Chall formula (1948): (7,8)

$$X_{c_{50}} = .1579_{X_1} + .0496_{X_2} + 3.6365$$

$X_{c_{50}}$ = reading grade score of a pupil who can answer correctly one-half of the McCall-Crabbs Test Lesson questions on a passage.

X_1 = % of words outside the Dale list of 3,000 words, Dale Score.

X_2 = average sentence length in passage.

Directions for use:

1. Select 100-word samples randomly throughout material, at least 3 to 5 samples.
2. Compute average sentence length in words (X_2).
3. Compute % of words out of the Dale list of 3,000 (X_1).
4. Put these computations into the formula.

Note: This formula is for grades 3-12. If computing a piece of material for primary levels and want to use this formula, use a table, chart or graph done in conjunction with the Dale-Chall formula.

Powers, Sumner, and Kearl in 1958 recalculated the Dale-Chall formula for greater accuracy. The directions for use are the same, but the numerical values are different. The grade range has been narrowed to 3-8.

Powers, Sumner, and Kearl Recalculation: (13)

$$X_{c_{50}} = 3.2672 + .0596_{X_2} + .1155_{X_1}$$

Corrected Dale-Chall Grade Levels Superimposed on Klare's Table for Rapid Determination of Dale-Chall Readability Scores. (14:204)

This Table is for broad categorizing of printed materials into grade level.

Chart 1

Corrected Dale-Chall Grade Levels Superimposed on
Klare's Table for Rapid Determination of
Dale-Chall Readability Scores

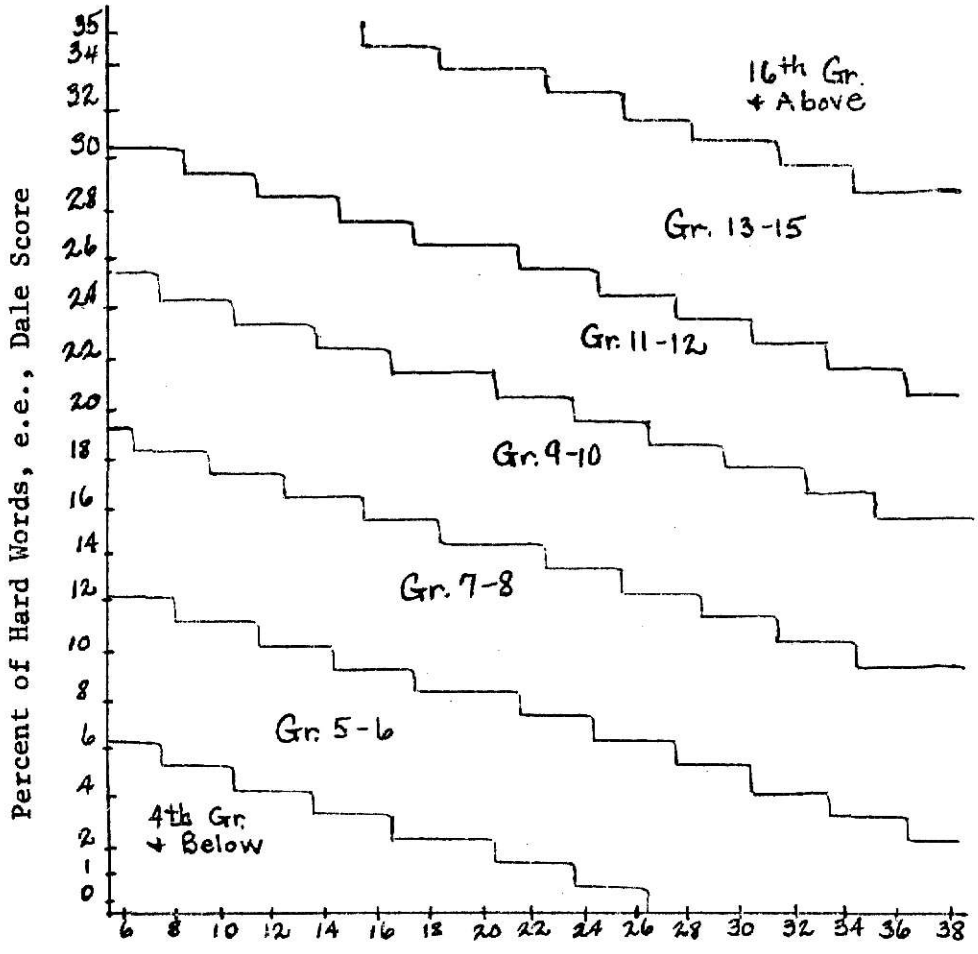
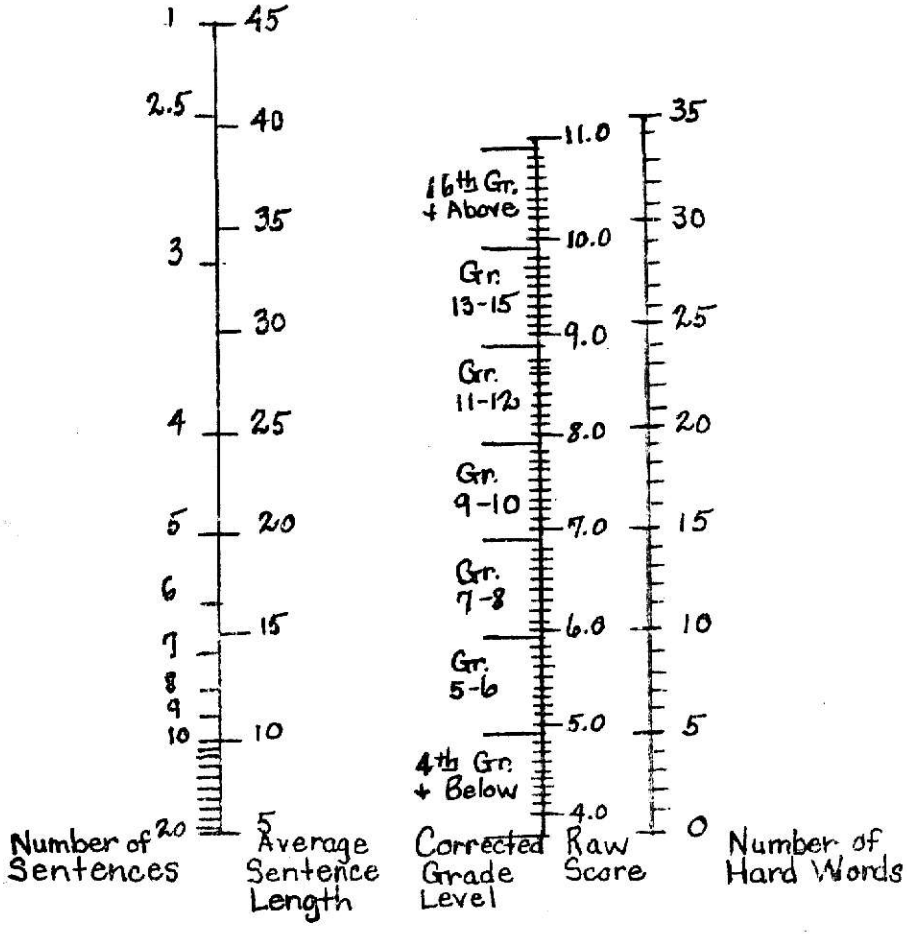


Chart 2

Dale-Chall Readability Formula: A Computation Ease (13:206)



Directions for use:

1. Count a 100-word sample from material.
2. Count the number of sentences in the 100 words, counting only those sentences which are complete within the 100-words sample.
3. Count the number of words in the 100-word sample which do not appear on the Dale List of 3,000.

4. Lay a straight edge so it touches
   a. the number of sentences as shown in left-hand column,
   b. the number of "hard words," those words not on Dale's List as shown on the right-hand column.
5. Read
   a. the Dale-Chall raw score and/or
   b. the Grade Level at the point where the straight edge intersects the column.

Dale List of 3000 Familiar Words (5, 45-54)

a
able
aboard
about
above
absent
accept
accident
account
ache(ing)
acorn
acre
across
act(s)
add
address
admire
adventure
afar
afraid
after
afternoon
afterward(s)
again
against
age
aged
ago
agree
ah
ahead
aid
aim
air
airfield
airport
airplane
airship
airy
alarm
alike
alive
all
alley
alligator
allow
almost
alone
along
aloud

already
also
always
am
America
American
among
amount
an
and
angel
anger
angry
animal
another
answer
ant
any
anybody
anyhow
anyone
anything
anyway
anywhere
apart
apartment
ape
apiece
appear
apple
April
apron
are
aren't
arise
arithmetic
arm
armful
army
arose
around
arrange
arrive(d)
arrow
art
artist
as
ash(es)
aside
ask

asleep
at
ate
attack
attend
attention
August
aunt
author
auto
automobile
autumn
avenue
awake(n)
away
awful(ly)
awhile
ax
baa
babe
baby(ies)
back
background
backward(s)
bacon
bad(ly)
badge
bag
bake(r)
baking
bakery
ball
balloon
banana
band
bandage
bang
banjo
bank(er)
bar
barber
bare(ly)
barefoot
bark
barn
barrel
base
baseball
basement
basket

bat
batch
bath
bathe
bathing
bathroom
bathtub
battle
battleship
bay
be(ing)
beach
bead
beam
bean
bear
beard
beast
beat(ing)
beautiful
beautify
beauty
became
because
become
becoming
bed
bedbug
bedroom
bedspread
bedtime
bee
beech
beef
beefsteak
beehive
been
beer
beet
before
bet
began
beggar
begged
begin
beginning
begun
behave
behind
believe

Dale List Continued

bell
belong
below
belt
beneath
bench
bend
bent
berry(ies)
beside(s)
best
bet
better
between
bib
bible
bicycle
bid
big(ger)
bill
billboard
bin
bind
bird
birth
birthday
biscuit
bit
bite
biting
bitter
black
blackberry
blackbird
blackboard
blackness
blacksmith
blame
blank
blanket
blast
blaze
bleed
bless
blessing
blew
blind(s)
blindfold
block
blood
bloom
blossom
blot
blow
blue
blueberry
bluebird
bluejay
blush
board
boast
boat
bob
bobwhite
body(ies)
boil(er)
bold
bone
bonnet
boo
book
bookcase
bookkeeper
boom
boot
born
borrow
boss
both
bother
bottle
bottom
bought
bounce
bow
bowl
bow-wow
box(es)
boxcar
boxer
boy
boyhood
bracelet
brain
brake
bran
branch
brass
brave
bread
break
breakfast
breast
breath
breathe
breeze
brick
bride
bridge
bright
brightness
bring
broad
broadcast
broke(n)
brook
broom
brother
brought
brown
brush
bubble
bucket
buckle
bud
buffalo
bug
buggy
build
building
built
bulb
bull
bullet
bum
bumblebee
bump
bun
bunch
bundle
bunny
burn
burst
bury
bus
bush
bushel
business
busy
but
butcher
butt
butter
buttercup
butterfly
buttermilk
butterscotch
button
buttonhole
buy
buzz
by
bye
cab
cabbage
cabin
cabinet
cackle
cage
cake
calendar
calf
call(er)(ing)
came
camel
camp
campfire
can
canal
canary
candle
candlestick
candy
cane
cannon
cannot
canoe
can't
canyon
cap
cape
capital
captain
car
card
cardboard
care
careful
careless
carelessness

Dale List Continued

carload
carpenter
carpet
carriage
carrot
carry
cart
carve
case
cash
cashier
castle
cat
catbird
catch
catcher
caterpillar
catfish
catsup
cattle
caught
cause
cave
ceiling
cell
cellar
cent
center
cereal
certain(ly)
chain
chair
chalk
champion
chance
change
chap
charge
charm
chart
chase
chatter
cheap
cheat
check
checkers
cheek
cheer
cheese
cherry
chest
chew
chick
chicken
chief
child
childhood
children
chill(y)
chimney
chin
china
chip
chipmunk
chocolate
choice
choose
chop
chorus
chose(n)
christen
Christmas
church
churn
cigarette
circle
circus
citizen
city
clang
clap
class
classmate
classroom
claw
clay
clean(er)
clear
clerk
clever
click
cliff
climb
clip
cloak
clock
close
closet
cloth
clothes
clothing
cloud(y)
clover
clown
club
cluck
clump
coach
coal
coast
coat
cob
cobbler
cocoa
coconut
cocoon
cod
codfish
coffee
coffeepot
coin
cold
collar
college
color(ed)
colt
column
comb
come
comfort
comic
coming
company
compare
conductor
cone
connect
coo
cook(ed)
cook(ing)
cooky(ie)(s)
cool(er)
coop
copper
copy
cord
cork
corn
corner
correct
cost
cot
cottage
cotton
couch
cough
could
couldn't
count
counter
country
county
course
court
cousin
cover
cow
coward(ly)
cowboy
cozy
crab
crack
cracker
cradle
cramps
cranberry
crank(y)
crash
crawl
crazy
cream(y)
creek
creep
crept
cried
croak
crook(ed)
crop
cross(ing)
cross-eyed
crow
crowd(ed)
crown
cruel
crumb
crumble
crush
crust
cry(ies)
cub

Dale List Continued

cuff
cup
cupboard
cupful
cure
curl(y)
curtain
curve
cushion
custard
customer
cut
cute
cutting
dab
dad
daddy
daily
dairy
daisy
dam
damage
dame
damp
dance(r)
dancing
dandy
danger(ous)
dare
dark(ness)
darling
darn
dart
dash
date
daughter
dawn
day
daybreak
daytime
dead
deaf
deal
dear
death
December
decide
deck
deed
deep

deer
defeat
defend
defense
delight
den
dentist
depend
deposit
describe
desert
deserve
desire
desk
destroy
devil
dew
diamond
did
didn't
die(d)(s)
difference
different
dig
dim
dime
dine
ding-dong
dinner
dip
direct
direction
dirt(y)
discover
dish
dislike
dismiss
ditch
dive
diver
divide
do
dock
doctor
does
doesn't
dog
doll
dollar
dolly

done
donkey
don't
door
doorbell
doorknob
doorstep
dope
dot
double
dough
dove
down
downstairs
downtown
dozen
drag
drain
drank
draw(er)
draw(ing)
dream
dress
dresser
dressmaker
drew
dried
drift
drill
drink
drip
drive(n)
driver
drop
drove
drown
drowsy
drug
drum
drunk
dry
duck
due
dug
dull
dumb
dump
during
dust(y)
duty

dwarf
dwell
dwelt
dying
each
eager
eagle
ear
early
earn
earth
east(ern)
easy
eat(en)
edge
egg
eh
eight
eighteen
eighth
eighty
either
elbow
elder
eldest
electric
electricity
elephant
eleven
elf
elm
else
elsewhere
empty
end(ing)
enemy
engine
engineer
English
enjoy
enough
enter
envelope
equal
erase(r)
errand
escape
eve
even
evening

Dale List Continued

ever
every
everybody
everyday
everyone
everything
everywhere
evil
exact
except
exchange
excited
exciting
excuse
exit
expect
explain
extra
eye
eyebrow
fable
face
facing
fact
factory
fail
faint
fair
fairy
faith
fake
fall
false
family
fan
fancy
far
faraway
fare
farmer
farm(ing)
far-off
farther
fashion
fast
fasten
fat
father
fault
favor
favorite
fear
feast
feather
February
fed
feed
feel
feet
fell
fellow
felt
fence
fever
few
fib
fiddle
field
fife
fifteen
fifth
fifty
fig
fight
figure
file
fill
film
finally
find
fine
finger
finish
fire
firearm
firecracker
fireplace
fireworks
firing
first
fish
fisherman
fist
fit(s)
five
fix
flag
flake
flame
flap
flash
flashlight
flat
flea
flesh
flew
flies
flight
flip
flip-flop
float
flock
flood
floor
flop
flour
flow
flower(y)
flutter
fly
foam
fog
foggy
fold
folks
follow(ing)
fond
food
fool
foolish
foot
football
footprint
for
forehead
forest
forget
forgive
forgot(ten)
fork
form
fort
forth
fortune
forty
forward
fought
found
fountain
four
fourteen
fourth
fox
frame
free
freedom
freeze
freight
French
fresh
fret
Friday
fried
friend(ly)
friendship
frighten
frog
from
front
frost
frown
froze
fruit
fry
fudge
fuel
full(y)
fun
funny
fur
furniture
further
fuzzy
gain
gallon
gallop
game
gang
garage
garbage
garden
gas
gasoline
gate
gather
gave
gay
gear
geese
general

Dale List Continued

gentle
gentleman
gentlemen
geography
get
getting
giant
gift
gingerbread
girl
give(n)
giving
glad(ly)
glance
glass(es)
gleam
glide
glory
glove
glow
glue
go(ing)
goes
goal
goat
gobble
God(g)
godmother
gold(en)
goldfish
golf
gone
good(s)
good-by(bye)
good-looking
goodness
goody
goose
gooseberry
got
govern
government
gown
grab
gracious
grade
grain
grand
grandchild
grandchildren
granddaughter
grandfather
grandma
grandmother
grandpa
grandson
grandstand
grape(s)
grapefruit
grass
grasshopper
grateful
grave
gravel
graveyard
gravy
gray
graze
grease
great
green
greet
grew
grind
groan
grocery
ground
group
grove
grow
guard
guess
guest
guide
gulf
gum
gun
gunpowder
guy
ha
habit
had
hadn't
hail
hair
haircut
hairpin
half
hall
halt
ham
hammer
hand
handful
handkerchief
handle
handwriting
hang
happen
happily
happiness
happy
harbor
hard
hardly
hardship
hardware
hare
hark
harm
harness
harp
harvest
has
hasn't
haste(n)
hasty
hat
hatch
hatchet
hate
haul
have
haven't
having
hawk
hay
hayfield
haystack
he
head
headache
heal
health(y)
heap
hear(ing)
heard
heart
heat(er)
heaven
heavy
he'd
heel
height
held
hell
he'll
hello
helmet
help(er)
helpful
hem
hen
henhouse
her(s)
herd
here
here's
hero
herself
he's
hey
hickory
hid
hidden
hide
high
highway
hill
hillside
hilltop
hilly
him
himself
hind
hint
hip
hire
his
hiss
history
hit
hitch
hive
ho
hoe
hog
hold(er)
hole
holiday

Dale List Continued

hollow
holy
home
homely
homesick
honest
honey
honeybee
honeymoon
honk
honor
hood
hoof
hook
hoop
hop
hope(ful)
hopeless
horn
horse
horseback
horseshoe
hose
hospital
host
hot
hotel
hound
hour
house
housetop
housewife
housework
how
however
howl
hug
huge
hum
humble
hump
hundred
hung
hunger
hungry
hunk
hunt(er)
hurrah
hurried
hurry

hurt
husband
hush
hut
hymn
I
ice
icy
I'd
idea
ideal
if
ill
I'll
I'm
important
impossible
improve
in
inch(es)
income
indeed
Indian
indoors
ink
inn
insect
inside
instant
instead
insult
intend
interested
interesting
into
invite
iron
is
island
isn't
it
its
it's
itself
I've
ivory
ivy
jacket
jacks
jail

jam
January
jar
jaw
jay
jelly
jellyfish
jerk
jig
job
jockey
join
joke
joking
jolly
journey
joy(ful)
joyous
judge
jug
juice
juicy
July
jump
June
junior
junk
just
keen
keep
kept
kettle
key
kick
kid
kill(ed)
kind(ly)
kindness
king
kingdom
kiss
kitchen
kite
kitten
kitty
knee
kneel
knew
knife
knit

knives
knob
knock
knot
know
known
lace
lad
ladder
ladies
lady
laid
lake
lamb
lame
lamp
land
lane
language
lantern
lap
lard
large
lash
lass
last
late
laugh
laundry
law
lawn
lawyer
lay
lazy
lead
leader
leaf
leak
lean
leap
learn(ed)
least
leather
leave(ing)
led
left
leg
lemon
lemonade
lend

Dale List Continued

length
less
lesson
let
let's
letter
letting
lettuce
level
liberty
library
lice
lick
lid
lie
life
lift
light(ness)
lightning
like
likely
liking
lily
limb
lime
limp
line
linen
lion
lip
list
listen
lit
little
live(s)
lively
liver
living
lizard
load
loaf
loan
loaves
lock
locomotive
log
lone
lonely
lonesome
long
look
lookout
loop
loose
lord
lose(r)
loss
lost
lot
loud
love
lovely
lover
low
luck(y)
lumber
lump
lunch
lying
ma
machine
machinery
mad
made
magazine
magic
maid
mail
mailbox
mailman
major
make
making
male
mama
mamma
man
manager
mane
manger
many
map
maple
marble
march(M)
mare
mark
market
marriage
married
marry
mask
mast
master
mat
match
matter
mattress
may(M)
maybe
mayor
maypole
me
meadow
meal
mean(s)
meant
measure
meat
medicine
meet(ing)
melt
member
men
mend
meow
merry
mess
message
met
metal
mew
mice
middle
midnight
might(y)
mile
milk
milkman
mill
miller
million
mind
mine
miner
mint
minute
mirror
mischief
miss(M)
misspell
mistake
misty
mitt
mitten
mix
moment
Monday
money
monkey
month
moo
moon
moonlight
moose
mop
more
morning
morrow
moss
most(ly)
mother
motor
mount
mountain
mouse
mouth
move
movie
movies
moving
mow
Mr.,Mrs.
much
mud
muddy
mug
mule
multiply
murder
music
must
my
myself
nail
name
nap
napkin
narrow
nasty

Dale List Continued

naughty
navy
near
nearby
nearly
neat
neck
necktie
need
needle
needn't
Negro
neighbor
neighborhood
neither
nerve
nest
net
never
nevermore
new
news
newspaper
next
nibble
nice
nickel
night
nightgown
nine
nineteen
ninety
no
nobody
nod
noise
noisy
none
noon
nor
north(ern)
nose
not
note
nothing
notice
November
now
nowhere
number
nurse
nut
oak
oar
outmeal
oats
obey
ocean
o'clock
October
odd
of
off
offer
office
officer
often
oh
oil
old
old-fashioned
on
once
one
onion
only
onward
open
or
orange
orchard
order
ore
organ
other
otherwise
ouch
ought
our(s)
ourselves
out
outdoors
outfit
outlaw
outline
outside
outward
oven
over
overalls
overcoat
overeat
overhead
overhear
overnight
overturn
owe
owing
owl
own(er)
ox
pa
pace
pack
package
pad
page
paid
pail
pain(ful)
paint(er)
painting
pair
pal
palace
pale
pan
pancake
pane
pansy
pants
papa
paper
parade
pardon
parent
park
part(ly)
partner
party
pass
passenger
past
paste
pasture
pat
patch
path
patter
pave
pavement
paw
pay
payment
pea(s)
peace(ful)
peach(es)
peak
peanut
pear
pearl
peck
peek
peel
peep
peg
pen
pencil
penny
people
pepper
peppermint
perfume
perhaps
person
pet
phone
piano
pick
pickle
picnic
picture
pie
piece
pig
pigeon
piggy
pile
pill
pillow
pin
pine
pineapple
pink
pint
pipe
pistol
pit
pitch
pitcher

Dale List Continued

pity
place
plain
plan
plane
plant
plate
platform
platter
play(er)
playground
playhouse
playmate
plaything
pleasant
please
pleasure
plenty
plow
plug
plum
pocket
pocketbook
poem
point
poison
poke
pole
police
policeman
polish
polite
pond
ponies
pony
pool
poor
pop
popcorn
popped
porch
pork
possible
post
postage
postman
pot
potato(es)
pound
pour

powder
power(ful)
praise
pray
prayer
prepare
present
pretty
price
prick
prince
princess
print
prison
prize
promise
proper
protect
proud
prove
prune
public
puddle
puff
pull
pump
pumpkin
punch
punish
pup
pupil
puppy
pure
purple
purse
push
puss
pussy
pussycat
put
putting
puzzle
quack
quart
quarter
queen
queer
question
quick(ly)
quiet

quilt
quit
quite
rabbit
race
rack
radio
radish
rag
rail
railroad
railway
rain(y)
rainbow
raise
raisin
rake
ram
ran
ranch
rang
rap
rapidly
rat
rate
rather
rattle
raw
ray
reach
read
reader
reading
ready
real
really
reap
rear
reason
rebuild
receive
recess
record
red
redbird
redbreast
refuse
reindeer
rejoice
remain

remember
remind
remove
rent
repair
repay
repeat
report
rest
return
review
reward
rib
ribbon
rice
rich
rid
riddle
ride(r)
riding
right
rim
ring
rip
ripe
rise
rising
river
road
roadside
roar
roast
rob
robber
robe
robin
rock(y)
rocket
rode
roll
roller
roof
room
rooster
root
rope
rose
rosebud
rot
rotten

Dale List Continued

rough
round
route
row
rowboat
royal
rub
rubbed
rubber
rubbish
rug
rule(r)
rumble
run
rung
runner
running
rush
rust(y)
rye
sack
sad
saddle
sadness
safe
safety
said
sail
sailboat
sailor
saint
salad
sale
salt
same
sand(y)
sandwich
sang
sank
sap
sash
sat
satin
satisfactory
Saturday
sausage
savage
save
savings
saw

say
scab
scales
scare
scarf
school
schoolboy
schoolhouse
schoolmaster
schoolroom
scorch
score
scrap
scrape
scratch
scream
screen
screw
scrub
sea
seal
seam
search
season
seat
second
secret
see(ing)
seed
seek
seem
seen
seesaw
select
self
selfish
sell
send
sense
sent
sentence
separate
September
servant
serve
service
set
setting
settle
settlement

seven
seventeen
seventh
seventy
several
sew
shade
shadow
shady
shake(r)
shaking
shall
shame
shan't
shape
share
sharp
shave
she
she'd
she'll
she's
shear(s)
shed
sheep
sheet
shelf
shell
shepherd
shine
shining
shiny
ship
shirt
shock
shoe
shoemaker
shone
shook
shoot
shop
shopping
shore
short
shot
should
shoulder
shouldn't
shout
shovel

show
shower
shut
shy
sick(ness)
side
sidewalk
sideways
sigh
sight
sign
silence
silent
silk
sill
silly
silver
simple
sin
since
sing
singer
single
sink
sip
sir
sis
sissy
sister
sit
sitting
six
sixteen
sixth
sixty
size
skate
skater
ski
skin
skip
skirt
sky
slam
slap
slate
slave
sled
sleep(y)
sleeve

Dale List Continued

sleigh
slept
slice
slid
slide
sling
slip
slipped
slipper
slippery
slit
slow(ly)
sly
smack
small
smart
smell
smile
smoke
smooth
snail
snake
snap
snapping
sneeze
snow(y)
snowball
snowflake
snuff
snug
so
soak
soap
sob
socks
sod
soda
sofa
soft
soil
sold
soldier
sole
some
somebody
somehow
someone
something
sometime(s)
somewhere
son
song
soon
sore
sorrow
sorry
sort
soul
sound
soup
sour
south(ern)
space
spade
spank
sparrow
speak(er)
spear
speech
speed
spell(ing)
spend
spent
spider
spike
spill
spin
spinach
spirit
spit
splash
spoil
spoke
spook
spoon
sport
spot
spread
spring
springtime
sprinkle
square
squash
squeak
squeeze
squirrel
stable
stack
stage
stair
stall
stamp
stand
star
stare
start
starve
state
station
stay
steak
steal
steam
steamboat
steamer
steel
steep
steeple
steer
stem
step
stepping
stick(y)
stiff
still(ness)
sting
stir
stitch
stock
stocking
stole
stone
stood
stool
stoop
stop
stopped
stopping
store
stork
stories
storm(y)
story
stove
straight
strange(r)
strap
straw
strawberry
stream
street
stretch
string
strip
stripes
strong
stuck
study
stuff
stump
stung
subject
such
suck
sudden
suffer
sugar
suit
sum
summer
sun
Sunday
sunflower
sung
sunk
sunlight
sunny
sunrise
sunset
sunshine
supper
suppose
sure(ly)
surface
surprise
swallow
swam
swamp
swan
swat
swear
sweat
sweater
sweep
sweet(ness)
sweetheart
swell
swept
swift
swim

Dale List Continued

swimming
swing
switch
sword
swore
table
tablecloth
tablespoon
tablet
tack
tag
tail
tailor
take(n)
taking
tale
talk(er)
tall
tame
tan
tank
tap
tape
tar
tardy
task
taste
taught
tax
tea
teach(er)
team
tear
tease
teaspoon
teeth
telephone
tell
temper
ten
tennis
tent
term
terrible
test
than
thank(s)
thankful
Thanksgiving
that
that's
the
theater
thee
their
them
then
there
these
they
they'd
they'll
they're
they've
thick
thief
thimble
thin
thing
think
third
thirsty
thirteen
thirty
this
tho
thorn
those
though
thought
thousand
thread
three
threw
throat
throne
through
throw(n)
thumb
thunder
Thursday
thy
tick
ticket
tickle
tie
tiger
tight
till
time
tin
tinkle
tiny
tip
tiptoe
tire
tired
'tis
title
to
toad
toadstool
toast
tobacco
today
toe
together
toilet
told
tomato
tomorrow
ton
tone
tongue
tonight
too
took
tool
toot
tooth
toothbrush
toothpick
top
tore
torn
toss
touch
tow
toward(s)
towel
tower
town
toy
trace
track
trade
train
tramp
trap
tray
treasure
treat
tree
trick
tricycle
tried
trim
trip
trolley
trouble
truck
true
truly
trunk
trust
truth
try
tub
Tuesday
tug
tulip
tumble
tune
tunnel
turkey
turn
turtle
twelve
twenty
twice
twig
twin
two
ugly
umbrella
uncle
under
understand
underwear
undress
unfair
unfinished
unfold
unfriendly
unhappy
unhurt
uniform
United States
unkind
unknown

Dale List Continued

unless
unpleasant
until
unwilling
up
upon
upper
upset
upside
upstairs
uptown
upward
us
use(d)
useful
valentine
valley
valuable
value
vase
vegetable
velvet
very
vessel
victory
view
village
vine
violet
visit
visitor
voice
vote
wag
wagon
waist
wait
wake(n)
walk
wall
walnut
want
war
warm
warn
was
wash(er)
washtub
wasn't
waste
watch
watchman
water
watermelon
waterproof
wave
wax
way
wayside
we
weak(ness)
weaken
wealth
weapon
wear
weary
weather
weave
web
we'd
wedding
Wednesday
wee
weed
week
we'll
weep
weigh
welcome
well
went
were
we're
west(ern)
wet
we've
whale
what
what's
wheat
wheel
when
whenever
where
which
while
whip
whipped
whirl
whisky
whisper
whistle
white
who
who'd
whole
who'll
whom
who's
whose
why
wicked
wide
wife
wiggle
wild
wildcat
will
willing
willow
win
wind(y)
windmill
window
wine
wing
wink
winner
winter
wipe
wire
wise
wish
wit
witch
with
without
woke
wolf
woman
women
won
wonder
wonderful
won't
wood(en)
woodpecker
woods
wool
woolen
word
wore
work(er)
workman
world
worm
worn
worry
worse
worst
worth
would
wouldn't
wound
wove
wrap
wrapped
wreck
wren
wring
write
writing
written
wrong
wrote
wrung
yard
yarn
year
yell
yellow
yes
yesterday
yet
yolk
yonder
you
you'd
you'll
young
youngster
your(s)
you're
yourself
yourselves
youth
you've

Appendix B

The Flesch Formulas

When using these two formulas, remember that the Reading Ease measures word and sentence length, or difficulty, and the Human Interest measures percent of personal words and sentences in a selection. Neither of these formulas extend below the fourth grade level.

Reading Ease

Directions for use:

1. Randomly pick five to ten 100-word samples, each sample starting at the beginning of a paragraph.
2. Count the number of syllables per 100 words (wl).
3. Compute average number of words per sentence (sl).

   Combine all samples, count sentences, and divide the number of words by number of sentences in all samples.
4. Put figures into Reading Ease formula:

   $$R.E. = 206.835 - .846wl - 1.015sl$$

   Or use Chart 3.

Human Interest

Directions for use:

1. Randomly pick five to ten 100-word samples.
2. Count number of personal words per 100 words (pw), then divide the total number of these by the number of samples. Personal Words are as follows:
   a. All first-, second-, and third-person pronouns except the neuter pronouns if referring to things.

b. All words of masculine/feminine gender. Don't count common gender words, such as doctor, lawyer, teacher.

c. The group words people and folks.

3. Count personal sentences per 100 sentences (ps), then divide the number of personal sentences in all the samples by the number of sentences in all the samples. Personal Sentences are as follows:

a. Spoken sentences, marked by quotation marks, or set off by colons or commas.

b. Questions or remarks addressed directly to reader.

c. Exclamations.

d. Grammatically incomplete sentences, the full meaning of which has to be inferred from context.

e. If a sentence fits in two categories, count only once.

4. Put figures into Human Interest formula:

H.I. = 3.635pw + .314ps

Or use Chart 4.

Chart 3

Flesch's "Reading Ease" Chart

Take ruler and connect "Words per Sentence" figure with "Syllables per 100 Words" figure. The intersection of ruler with center line shows Reading Ease score.

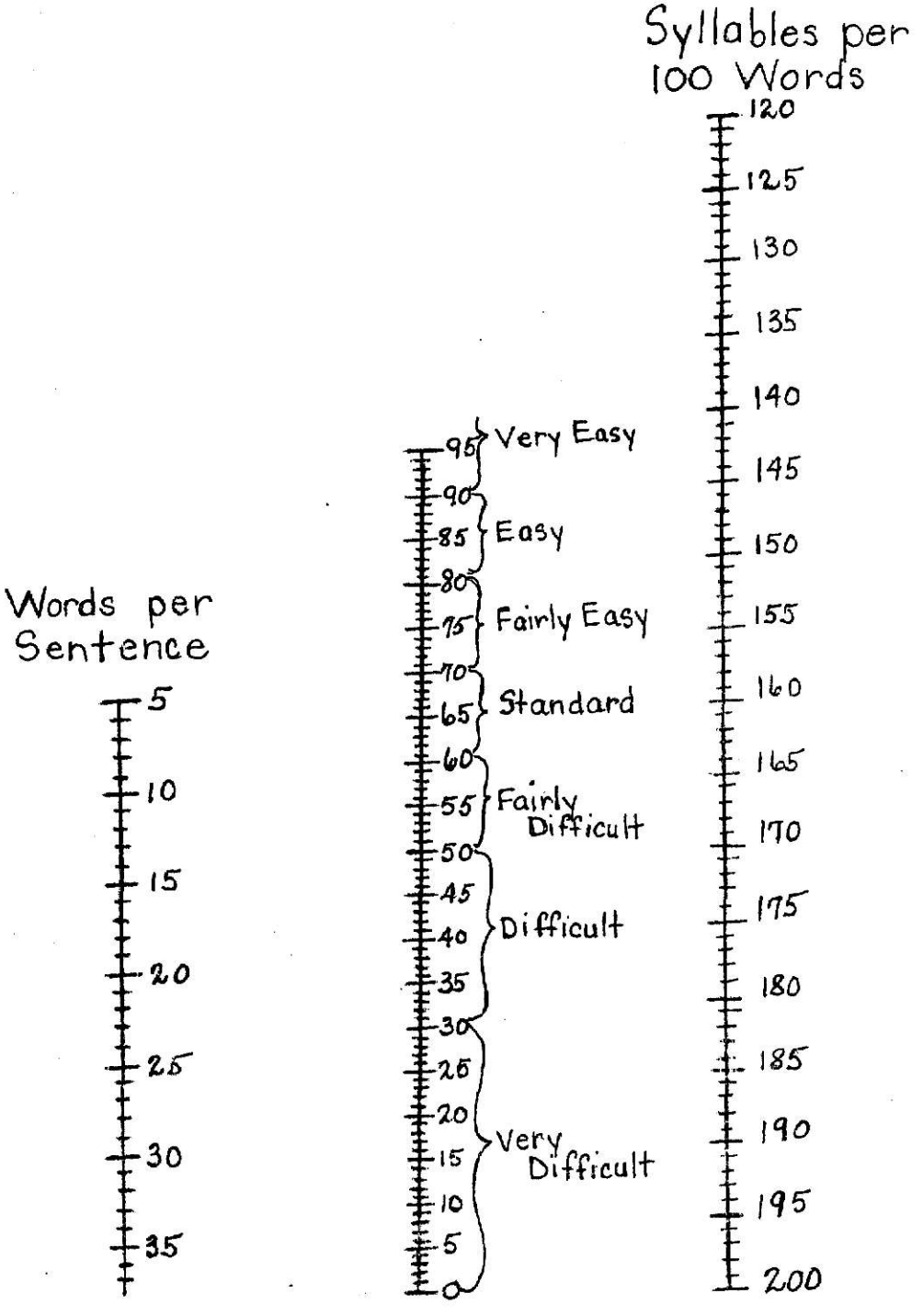
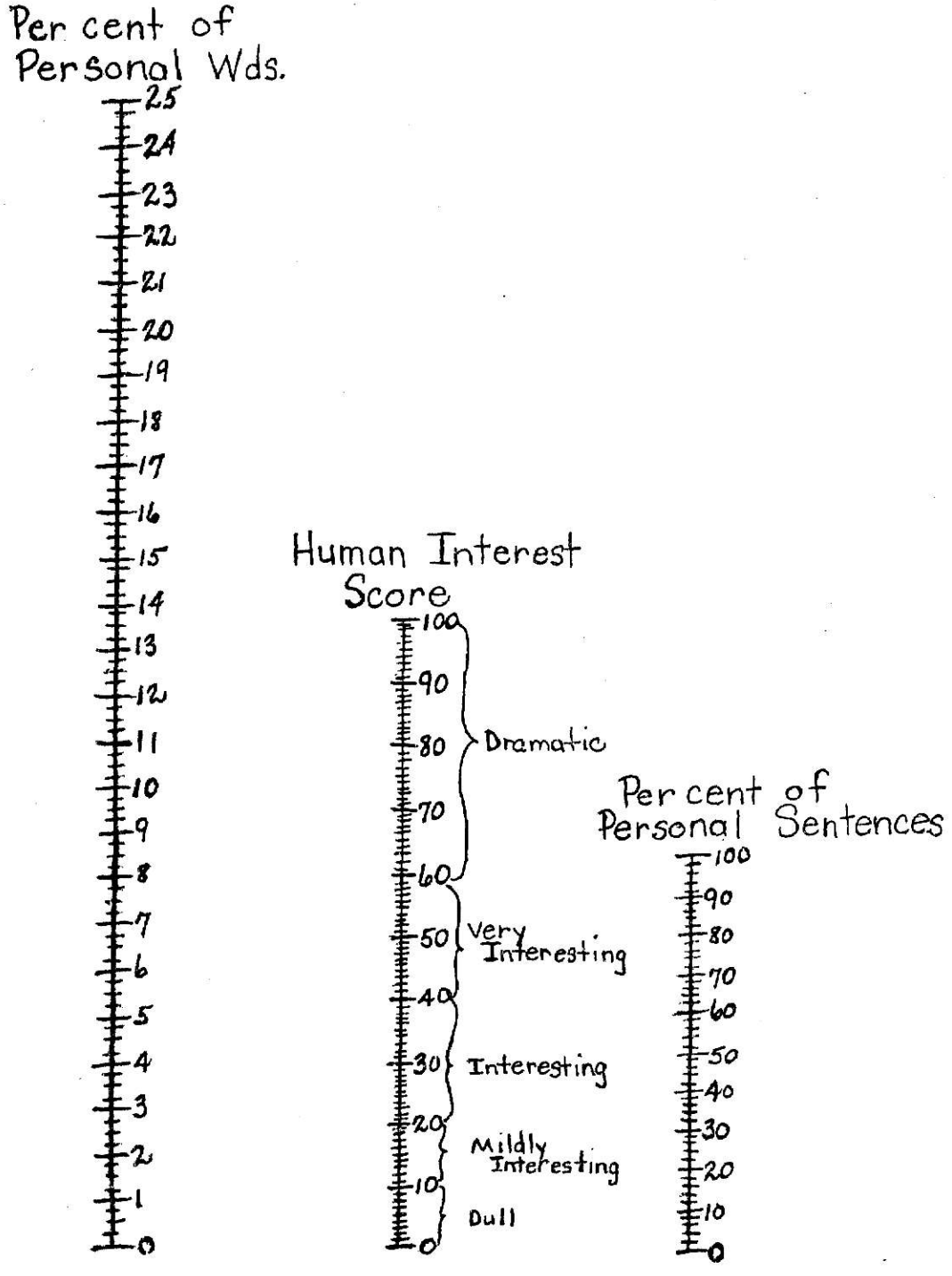


Chart 4

Flesch's "Human Interest" Chart

Take ruler and connect "Personal Words" figure with "Personal Sentences" figure. The intersection of the ruler with the center line shows Human Interest Score.



Appendix C

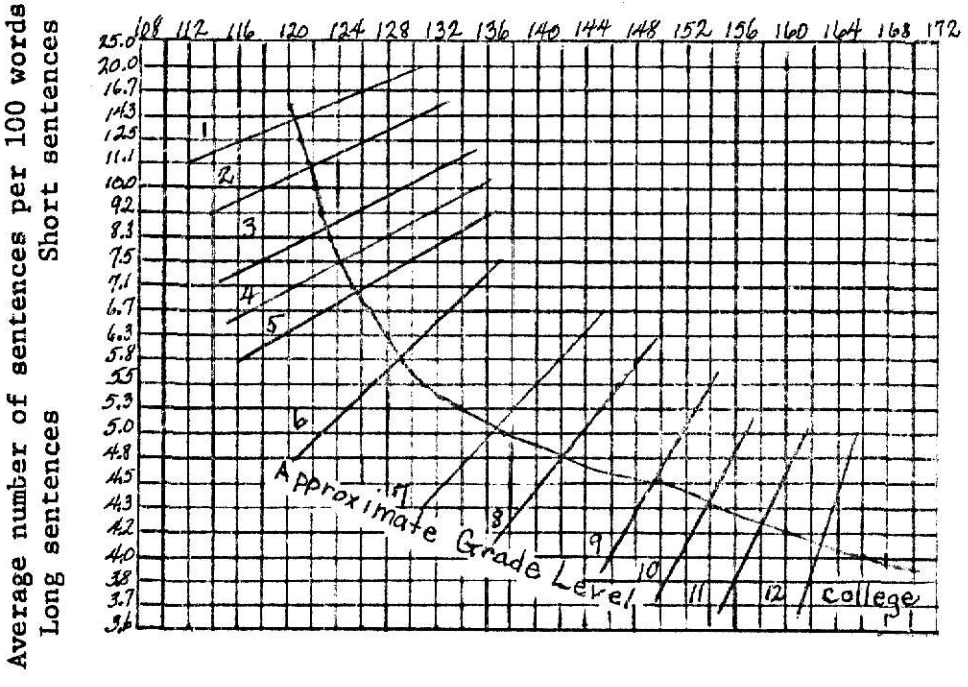
FOG Formula

The Fog formula by Fry is done on basically the same factors as the Dale-Chall formula, is worked out on a graph, and extends to the first grade level. (8:577)

Graph 1

Average number of syllables per 100 words

Short words Long words



Directions for use:

1. Randomly select three 100-word passages.
2. Compute average number of words per 100 words, skipping all proper nouns.
3. Compute average number of syllables per 100 words.

4. Plot these averages on the graph to determine area of readability.
5. If great variability in samples is observed, plot more passages.

Appendix D

Cloze Procedure

The cloze procedure involves the child in the evaluation of printed material. It can be used on any grade level. (18,19)

Directions for use:

1. Randomly select three to five passages of 100 words throughout material, completing the sentence of the 100th word.
2. Re-type selections deleting every 5th word with a blank an equal number of spaces long (10 spaces).
3. Administer to child/group.
4. Each word that is exactly the same word in the non-deleted passage is correct. (There are variations of this scoring procedure.)
5. Figure % of correct words, then use table to get equivalent score on multiple-choice test.

Table II

Equivalent Cloze and Multiple-Choice Test % Scores

Cloze Scores	Multiple-Choice Scores	
	Raw	Corrected
19	50	33
23	55	40
27	60	47
31	65	53
35	70	60
38	75	67
42	80	73
46	85	80
50	90	87
53	95	93
57	100	100

READABILITY MEASURES FOR THE CLASSROOM TEACHER

by

Linda W. Jackson

B.S., Kansas State University, 1970

AN ABSTRACT OF A MASTER'S REPORT

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ABSTRACT

The reading activities in school are varied, and teachers have to match child and book in many reading situations. The purpose of this paper is to find easy and reliable measures for the classroom teacher that can be used in the many reading situations that occur in a school setting.

Since the first researchers developed readability formulas in the 1920s, there have been many formulas developed and many studies done. The cloze procedure, a fairly new measure of readability, first used in the early 1950s, also has variations, but because of its more recent development as a readability measure the research has not been as extensive as the research on the formulas. These two methods of readability measurement represent two different approaches to readability or difficulty of material. The formulas predict difficulty by using only the material, while the cloze procedure predicts difficulty of material from an interaction of child and material.

The formulas chosen from the existing literature for reliability and ease in application are as follows: the Dale-Chall formula, with recent tables and charts to facilitate use, the Flesch Reading Ease and Human Interest Scale formula, and the Fry formula, FOG, using basically the same factors as the Dale-Chall, but quicker and easier to apply because the factors are worked out on a graph. Another method, the cloze procedure, was chosen because it involved the child in evaluation of reading material. With the increased interest in individual reading programs,

the cloze procedure could be a valuable approach for finding difficulty of material.

One measure of readability has not yet been developed, but a teacher who understands the uses and limitations of readability measurement can help children discover reading material easy enough to master and difficult enough to challenge.