

Correlating Selected Variables in a Readability Index

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Abstract

Online readability tools have been largely used for measuring texts. Determining the readability of written materials using these tools seems to have been the only option left for the researchers to do. Luckily, experimentation comes into play at times, looking at other items in readability indexes. Such is the case with this present work—it compares and contrasts selected variables there at work for the purpose of determining their relationships. Given some data drawn from a study involving readability tools, this inquiry focuses on the correlational aspect of certain variables instead of just zeroing in on the readability, or otherwise, of some given texts. With a case study on the readability of reading texts in a mandated textbook, useful readability tools were browsed, their variables correlated. The results are a number of significant relationships, and tips to benefit from their emphasis.

Keywords: grade levels, readability indexes, text characteristics, reading ages, readability sites

Introduction

Typical language classrooms nowadays have been utilizing technology, electricity, and the net for learning and instruction. Once such online platforms being used are the tools in readability indexes, this is in addition to e-books and other numerous online resources for pedagogical purposes. As the increasing number of language teachers from academic institutions continually accesses online materials, the necessity for them to scrutinize readability tools is likewise augmenting in importance.

Oftentimes confused with legibility, readability is what renders a text easier to read as compared to others. It juxtaposes a reading material's reading level to the readers' reading-with-comprehension level. Readability formulas are predicting readability in analytical manners. Readability levels of written materials then can be measured by said readability formulas as "their predictions correlate very well with the results of the actual readability measurements of expert judgments, comprehension tests, and the cloze procedures" (Kondru, 2006).

Defining readability as the "ease of understanding or comprehension due to the style of writing," Klare (1963) takes writing as alienated from organization, coherence, and content. In the same manner, Hargis (1998) took readability as a trait of clarity, the "ease of reading words and sentences." Underscoring interaction between readers and the text, McLaughlin (1969), SMOG readability formula creator, looked at readability as "the degree to which a given class of people find certain reading matter compelling and comprehensible."

Readability in progress

What makes a readable text? This has been the question asked to librarians, students, and teachers during the initial studies on readability. Thorndike's Teachers' Work Book (1921) formed part of these readability assessment beginnings, yielding some ways for measuring word difficulties. Thorndike tabulated words based on the frequency of their usage in general literature, assuming that frequently encountered words by readers were less difficult to comprehend than those that rarely appeared. In short, familiarity results in understanding. This book became the first extensive listing of words in English, by frequency.

Later on, other reading lessons and word lists came about to measure word difficulty. Knowledge of words, as Chall and Dale (1995) had it, is a firm gauge of a reader's reading comprehension performance. "It is no accident that vocabulary is also a strong predictor of text difficulty," they wrote. Reviewing research on word frequency, Klare (1968) noted that humans don't just use words more often, they also grasp the words fast, have preference for them, and comprehend more readily, thus the variable's role in gauging readability. Subjected to scrutiny in the 1920s were word factors and sentence variety, the latter being an additional factor to study.

Kitson (1921) published the *Mind of the Buyer*, suggesting why and how newspaper and magazine buyers differ from each other. He discovered that word and sentence lengths, measured by syllables, proved to be noteworthy readability indicators, thus confirming his theories that made use of periodicals. Other researchers and experts later confirmed his claim. Sentence length, they say, appropriately measures difficulty for it gauges relationships (Catalano, 1990).

These initial steps, yet lacking readability formulas, led to the development of the same. Thereafter, the word-sentence length linguistic indicators remained as main factors of today's readability formulas extensively utilized to classify readings texts. Readability formulas, as Kirkwood and Wolfe (1980) had it, "contain a measure of vocabulary load and sentence length."

As Lively and Pressey (1923) were trying to select science textbooks, the first-ever readability formula emerged. Those books supposedly for junior high school contained highly-technical terms that teachers could not help but spend class periods teaching vocabulary. The tandem then proposed to measure the vocabulary issue in textbooks by relating difficult words to their frequency, and by developing a vocabulary measurement in both textbooks and other reading materials in schools. They assumed, as expected, that common words are easier to understand. Their method may not have been fit to measure readability, unable as it was to provide a scale in interpreting the scores, but their study led to the readability formulas' creation.

Rudolph Flesch (1948), an expert on readability, gets the credit for that most renowned readability formula, which is used in Microsoft Office Word. Thus, the computer now performs readability evaluations through a grammar or editing software that can tell the readability level of reading texts. This can be done now by what they call readability tools which, when used to a piece of text, could result in varying scores as well as reading levels.

While these tools can enable appraisal of written texts for their readability application, these same tools just provide a turning point in gauging clarity of information; they may even urge poor writing. Thus, there is a need to also appraise these appraisal devices, and one way of doing that is by correlating some of the variables involved, like what this particular study tries to pursue.

Problem and objective

This study determines the correlations between selected variables in a readability index, thereby enhancing their awareness for text preferences and reading activities.

The following questions will help carry out this objective:

1. What are the readability grade level score means, reading ages, and grade levels of the reading texts according to the readability index?
2. Is there a significant difference between the readability grade level score means of the reading texts according to the readability index? If there is, what made the significant difference?
3. What are the readability grade level score means of the reading texts according to the readability site?
4. Is there a significant difference between the readability grade level score means of the reading texts according to the readability site? If there is, what made the significant difference?

Method

This qualitative inquiry uses existing documents, mostly accessed online, as materials for descriptions and analysis. Moreover, it is prescriptive albeit in tabular forms, of how variables correlate to one another in readability indexes. It graphically shows how readability tools, as measuring devices, can be measured themselves using correlational descriptions. The mode of accessing those tools, as sampled in this study, can itself serve as guide for the language teachers as they choose written texts. Such method is partly utilized as follows:

- Use different online readability sites.
- Use complementary or statistically compatible readability indexes to determine the readability level of a test.
- Read the comments/conversation section of the readability site for more ideas about it. Proceed to experiencing the site yourself.
- Take advantage of the other features of the sites e.g., inventory of words, like problems in the text, etc.
- Check for updates or developments of the site.
- Be aware that sites can be moved to new addresses.

- Know that some sites have limited number of words allowed for analysis.
- Test the accuracy of the readability sites by using other statistical techniques.
- Analyze data using other groupings for comparison like by chapter, topic, etc.
- Test Flesh Reading Ease index found on different sites.

Results and Findings

Readability Grade Level Score Means, Reading Ages, and Grade Levels of the Reading Texts Per Readability Index

Reading Text	ARI		Reading Ages		Grade Levels		FKGL		Reading Ages		Grade Levels		CLI		Reading Ages		Grade Levels		GFI		Reading Ages		Grade Levels		SMOG		Reading Ages		Grade Levels		Total		Reading Ages		Grade Levels	
	Mean				Mean				Mean				Mean				Mean				Mean				Mean				Mean				Mean			
A	6.4678	11-13	6-7	6.4811	11-13	6-7	10.6511	15-17	10-11	8.6700	13-15	8-9	7.9056	12-14	7-8	8.0351	12-14	7-8																		
B	6.1311	10-12	5-6	6.8544	11-13	6-7	10.3778	14-16	9-10	7.8967	12-14	7-8	7.5711	12-14	7-8	7.7662	12-14	7-8																		
C	10.9267	15-17	10-11	11.0122	15-17	10-11	12.5911	18-22	College	12.8256	18-22	College	10.9733	15-17	10-11	11.6658	16-18	11-12																		
D	11.6944	16-18	11-12	11.6511	16-18	11-12	12.6489	18-22	College	12.9111	18-22	College	11.0078	15-17	10-11	11.9827	16-18	11-12																		
E	7.1111	11-13	6-7	6.8556	11-13	6-7	9.6244	14-16	9-10	8.9100	13-15	8-9	8.1500	12-14	7-8	8.1302	12-14	7-8																		
F	8.8878	13-15	8-9	8.6878	13-15	8-9	11.2289	15-17	10-11	10.6422	15-17	10-11	9.3822	13-15	8-9	9.7658	14-16	9-10																		
G	10.6211	15-17	10-11	10.5700	15-17	10-11	12.1500	16-18	11-12	12.1133	16-18	11-12	10.2656	14-16	9-10	11.1440	15-17	10-11																		
H	11.2756	15-17	10-11	10.6511	15-17	10-11	12.4967	18-22	College	11.6900	16-18	11-12	9.8422	14-16	9-10	11.1911	15-17	10-11																		
I	9.7944	14-16	9-10	10.1822	14-16	9-10	12.8767	18-22	College	11.5078	16-18	11-12	10.2556	14-16	9-10	10.9233	15-17	10-11																		
J	10.9778	15-17	10-11	11.4556	16-18	11-12	12.8011	18-22	College	12.6800	18-22	College	10.9944	15-17	10-11	11.7818	16-18	11-12																		
K	4.8089	9-11	4-5	5.0300	9-11	4-5	6.7256	11-13	6-7	7.4878	12-14	7-8	6.0700	10-12	5-6	6.0244	10-12	5-6																		
L	6.9667	11-13	6-7	7.6789	12-14	7-8	9.2678	13-15	8-9	9.0156	13-15	8-9	7.8611	12-14	7-8	8.1580	12-14	7-8																		
Total	8.8053	13-15	8-9	8.9258	13-15	8-9	11.1200	15-17	10-11	10.5292	15-17	10-11	9.1899	13-15	8-9	9.7140	14-16	9-10																		

Note: ARI = Automated Readability Index; FKGL = Flesch-Kincaid Grade Level; CLI = Coleman-Liau Index; GFI = Gunning Fog Index; SMOG = Simple Measure of Gobbledygook; A = Big Talkers; B = Koalas; C = The Power of Advertising; D = International Marketing No Va; E = Race to the End of the Earth; F = Lance Armstrong; G = Fortune-Telling; H = The Fortune Sellers; I = Seattle; J = The Best Cities in the United States; K = Why the Sea Is Salty; L = Why Is the Ocean Salty?

Readability Grade Level Score Means and Standard Deviations of the Reading Texts Per Readability Index

Reading Text	Readability Indexes											
	ARI		FKGL		CLI		GFI		SMOG		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
A	6.4678	0.3337	6.4811	1.0668	10.6511	1.1319	8.6700	1.6227	7.9056	2.2237	8.0351	2.0785
B	6.1311	0.6590	6.8544	1.3673	10.3778	1.1091	7.8967	1.4558	7.5711	2.0273	7.7662	1.9744
C	10.9267	0.6197	11.0122	1.0994	12.5911	0.6488	12.8256	1.7391	10.9733	2.3985	11.6658	1.6460
D	11.6944	0.5946	11.6511	1.2735	12.6489	0.6938	12.9111	1.4234	11.0078	2.2816	11.9827	1.5042
E	7.1111	0.5172	6.8556	0.9409	9.6244	0.8532	8.9100	0.9593	8.1500	1.8635	8.1302	1.5055
F	8.8878	1.0062	8.6878	1.3903	11.2289	0.7385	10.6422	1.1831	9.3822	2.1911	9.7658	1.6681
G	10.6211	0.5077	10.5700	1.2965	12.1500	0.9077	12.1133	1.3294	10.2656	2.2156	11.1440	1.5481
H	11.2756	0.3662	10.6511	1.2553	12.4967	0.7802	11.6900	0.9254	9.8422	1.9371	11.1911	1.4465
I	9.7944	0.7411	10.1822	1.1335	12.8767	3.5814	11.5078	1.9855	10.2556	2.5863	10.9233	2.4317
J	10.9778	0.5154	11.4556	1.3919	12.8011	0.8715	12.6800	1.4147	10.9944	2.1062	11.7818	1.5386
K	4.8089	1.3943	5.0300	1.4010	6.7256	0.8035	7.4878	0.5289	6.0700	1.7133	6.0244	1.5671
L	6.9667	0.7525	7.6789	1.0995	9.2678	0.9503	9.0156	0.6561	7.8611	1.8050	8.1580	1.3839

Note: ARI = Automated Readability Index; FKGL = Flesch-Kincaid Grade Level; CLI = Coleman-Liau Index; GFI = Gunning Fog Index; SMOG = Simple Measure of Gobbledygook; A = Big Talkers; B = Koalas; C = The Power of Advertising; D = International Marketing No Va; E = Race to the End of the Earth; F = Lance Armstrong; G = Fortune-Telling; H = The Fortune Sellers; I = Seattle; J = The Best Cities in the United States; K = Why the Sea Is Salty; L = Why Is the Ocean Salty?; SD = Standard deviation

Significant Difference of the Readability Grade Level Score Means of each Reading Text Per Readability Index

Reading Text	Analysis of Variance		
	F	df	p*
A	13.5045	4	4.7160e-07
B	11.9613	4	1.7464e-06
C	3.8098	4	0.0102
D	2.8441	4	0.0364
E	9.8708	4	1.1871e-05
F	5.7912	4	0.0009
G	3.9644	4	0.0084
H	6.6123	4	0.0003
I	2.8587	4	0.0357
J	3.8520	4	0.0097
K	7.3885	4	0.0001
L	6.5450	4	0.0004

Note. A = Big Talkers; B = Koalas; C = The Power of Advertising; D = International Marketing No Va; E = Race to the End of the Earth; F = Lance Armstrong; G = Fortune-Telling; H = The Fortune Sellers; I = Seattle; J = The Best Cities in the United States; K = Why the Sea Is Salty; L = Why Is the Ocean Salty?; F = F distribution, Fisher's F ratio; df = Degrees of freedom; p = Probability; *p = < .05

Significant Difference of the Readability Grade Level Score Means of all Reading Texts Per Readability Index

Readability Index	Analysis of Variance				
	Mean	SD	df	F	p*
ARI	8.8053	2.3981	4	20.5352	8.8818e-16
FKGL	8.9258	2.4788			
CLI	11.1200	2.2092			
GFI	10.5292	2.3197			
SMOG	9.1899	2.5546			
Total	9.7140	2.5628			

Note. ARI = Automated Readability Index; FKGL = Flesch-Kincaid Grade Level; CLI = Coleman-Liau Index; GFI = Gunning Fog Index; SMOG = Simple Measure of Gobbledygook; SD = Standard deviation; F = F distribution, Fisher's F ratio; df = Degrees of freedom; p = Probability; *p = < .05

Readability Grade Level Score Means and Standard Deviations of the Reading Texts Per Readability Site

Reading Text	Readability Sites																			
	Site 1		Site 2		Site 3		Site 4		Site 5		Site 6		Site 7		Site 8		Site 9		Total	
	Mean	SD	Mean	SD	Mean	SD	Std.	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
A	8.0400	2.0157	8.0600	2.3713	8.3340	1.8813	6.9200	3.3700	8.0400	2.3692	8.0600	2.3713	8.4760	1.5990	7.7920	1.8631	8.5940	1.8167	8.0351	2.0785
B	7.3800	1.6829	7.2600	2.2412	8.7320	1.8244	7.6400	2.9228	7.1800	2.1568	7.2600	2.2412	7.9900	1.3161	7.8320	2.1443	8.6220	1.9297	7.7662	1.9744
C	11.8600	1.2779	11.5600	1.5126	12.2520	1.4124	10.3800	2.7087	10.9000	1.7479	11.5600	1.5126	12.1880	0.9736	11.4380	1.5389	12.8540	1.5544	11.6658	1.6460
D	11.7600	1.1014	11.9000	1.2748	12.0540	1.2922	11.1800	2.9736	11.9000	1.2748	11.9000	1.2748	12.4180	0.7768	11.9080	2.0015	12.8240	1.2846	11.9827	1.5042
E	8.1800	1.8089	7.9400	1.5043	8.1600	1.6131	7.8000	2.3990	7.8800	1.4307	7.9600	1.5176	8.6960	1.2868	7.9300	1.1760	8.6260	1.6105	8.1302	1.5055
F	9.8400	1.5437	9.2000	1.7073	10.4240	1.4406	9.0600	2.7446	9.1400	1.6592	9.2000	1.7073	9.7160	1.1835	10.6000	1.1973	10.7120	1.6572	9.7658	1.6681
G	11.1600	1.3903	11.0800	1.5304	11.2420	1.3384	10.3800	3.1236	11.0600	1.5043	11.0800	1.5304	11.5520	0.9222	11.2260	1.5697	11.5160	1.2120	11.1440	1.5481
H	10.8800	1.3664	11.1000	1.6279	11.1900	0.7255	10.5000	2.8679	11.0800	1.5975	11.1000	1.6279	11.7560	0.5902	11.4340	1.5203	11.6800	0.6001	11.1911	1.4465
I	11.1000	1.6837	10.1400	1.2219	10.8860	1.2976	9.6000	2.7532	10.2600	1.3353	10.1800	1.2716	10.9660	1.4219	10.4520	1.6612	14.7260	4.5472	10.9233	2.4317
J	11.6000	1.4405	11.6800	1.3405	11.7140	1.3108	10.7200	2.5587	11.5200	1.4325	11.6600	1.3557	12.2520	1.1057	12.1220	1.8870	12.7680	1.4216	11.7818	1.5386
K	5.6000	1.6355	5.5800	1.6814	6.1800	1.2709	7.0400	2.5265	5.5800	1.6814	5.5800	1.6814	5.9840	1.3039	6.5420	1.1678	6.1340	1.4691	6.0244	1.5671
L	7.8000	1.2865	7.9800	1.6146	8.5600	1.2479	8.3200	2.2687	7.9200	1.5659	8.0000	1.5922	8.2120	1.0746	8.1960	1.2416	8.4340	1.3342	8.1580	1.3839

Note. Site 1 = Edit Central; Site 2 = Joes Web Tools; Site 3 = Language and Translation Technology Team; Site 4 = Manco; Site 5 = Readability-Score.com; Site 6 = The Readability Test Tool; Site 7 = Test Document Readability; Site 8 = Text Statistics and Readability Analyzer; Site 9 = WordsCount; A = Big Talkers; B = Koalas; C = The Power of Advertising; D = International Marketing No Va; E = Race to the End of the Earth; F = Lance Armstrong; G = Fortune-Telling; H = The Fortune Sellers; I = Seattle; J = The Best Cities in the United States; K = Why the Sea Is Salty; L = Why Is the Ocean Salty?; SD = Standard deviation

Significant Difference of the Readability Grade Level Score Means of each Reading Text Per Readability Site

Reading Text	Analysis of Variance		
	F	df	p*
A	0.2367	8	0.9811
B	0.3907	8	0.9184
C	1.0127	8	0.4440
D	0.3992	8	0.9136
E	0.1994	8	0.9891
F	0.7662	8	0.6343
G	0.2053	8	0.9880
H	0.3195	8	0.9534
I	2.3950	8	0.0349
J	0.6327	8	0.7449
K	0.4868	8	0.8574
L	0.1404	8	0.9967

Note. A = Big Talkers; B = Koalas; C = The Power of Advertising; D = International Marketing No Va; E = Race to the End of the Earth; F = Lance Armstrong; G = Fortune-Telling; H = The Fortune Sellers; I = Seattle; J = The Best Cities in the United States; K = Why the Sea Is Salty; L = Why Is the Ocean Salty?; F = F distribution, Fisher's F ratio; df = Degrees of freedom; p = Probability; *p = < .05

Significant Difference of the Readability Grade Level Score Means of all Reading Texts Per Readability Site

Sites	Analysis of Variance				
	Mean	SD	df	F	p*
1	9.6000	2.4619	8	1.8494	0.0658
2	9.4533	2.5130			
3	9.9773	2.2523			
4	9.1283	2.9149			
5	9.3717	2.4733			
6	9.4617	2.5078			
7	10.0172	2.3024			
8	9.7893	2.3985			
9	10.6242	2.9993			
Total	9.7137	2.5634			

Note. Site 1 = Edit Central; Site 2 = Joes Web Tools; Site 3 = Language and Translation Technology Team; Site 4 = Mancko; Site 5 = Readability-Score.com; Site 6 = The Readability Test Tool; Site 7 = Test Document Readability; Site 8 = Text Statistics and Readability Analyzer; Site 9 = WordsCount; SD = Standard deviation; F = F distribution, Fisher's F ratio; df = Degrees of freedom; p = Probability; *p = < .05

Conclusion

In conclusion, this study observed that there are readability grade level score means, reading ages, and grade levels of the reading texts per readability index. There exists a significant difference between the readability grade level score means and standard deviations of the reading texts. Significant differences also exist among readability grade level score means of each reading text per readability index, and per readability site. While readability tools work as appraisal devices, we may appraise them in turn by correlating certain variables in readability indexes.

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