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Developing the Korean EFL Readability Formula (KRF)*

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It has long been shown that Korean EFL students have not practiced extensive reading in school curriculum. Their vocabulary knowledge is limited and a tool for measuring text readability for them has hardly been developed and used. The study aimed to check the current situations on the above issues and develop a reading framework appropriate for extensive reading within the national English curriculum, including the Readability Formula in Korean EFL contexts (KRF). The study consists of four steps. The study does a survey to check the current Korean EFL situations on the issues, suggests a new vocabulary learning size, develops a readability formula as a tool for measuring text difficulty based on the newly suggested vocabulary size, and finally validates the formula with various kinds of English books, including the primary and secondary school English textbooks. It is expected that this study will provide a model for the vocabulary size and the readability index for extensive reading in EFL contexts.

[extensive reading/EFL contexts/vocabulary size/readability formula]

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I. INTRODUCTION

English educators have had difficulties in matching EFL students with appropriate texts when they encourage students to read books in English. If students are informed of their reading proficiency and appropriate texts for them, few of them will be frustrated when they attempt to read books in English. This study aims to develop a Korean EFL reading framework and explores how it matches with the Korean national curriculum for English.

The reading framework developed by this study is a tool for measuring a text to support English educators and students. Since the framework for reading is based on the national curriculum, it helps educators to select a text at an appropriate grade level for their students. Common readability formulas in use, such as the Dale Chall, Flesch-Kincaid grade level, or the Lexile Framework do not fit for Korean students because they were originally designed for students whose native language is English. For middle school students learning English as a foreign language in Korea, for instance, even English textbooks designed for elementary students using English as a native language are likely to be beyond their reading ability in vocabulary and sentence structure while it looks below their cognitive ability in content. Therefore, a new reading framework for the text measurement based on the national curriculum is needed, so that students can fluently read a variety of materials appropriate for their grade level with their knowledge of vocabulary and sentence complexity required in the national curriculum. For a new reading framework in Korean EFL contexts, this study suggests a new vocabulary learning size and develops a readability formula as a tool for measuring text difficulty based on the newly suggested vocabulary size.

II. LITERATURE REVIEW: READABILITY FORMULA

Common readability formulas have been used to determine how much the readers could comprehend texts. According to Carrell(1987, p. 22), the origin of readability formulas can be traced back to the late 19th Century in the United States and presently, there are over 200 readability formulas with varying degrees of accuracy and success rate. The early work on readability formulas began between 1915 and 1920 in search of objective methods to supplement subjective judgments of individual reading abilities, specifically with the advent of standardized reading tests. Since 1920, more than 50 readability formulas have been produced in the hopes of providing tools to measure text difficulty more accurately and efficiently(Crossley et al., 2008). For the past 40 years or more, teachers have used readability formulas to estimate the difficulty level of trade

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books and textbooks(Tompkins, 2003).

Most traditional readability formulas are based on two measures that have been verified by many research studies(Fry, 2002): syntactic and semantic difficulties. Syntactic difficulty is usually measured by sentence length and semantic difficulty is judged by word length or sometimes frequency.

The Dale-Chall formula and Fry Graph(Fry, 1977) are examples of traditional wide-range readability formulas which give broad grade-level designations, especially at primary grades and Lexiles developed by Metametrix in 1995, DRP (Degrees of Reading Power) by Touchstone Applied Science in 1999, and ATOS by Advantage Learning Systems in 2000 are examples of large company book readability formulas. In this study, five sample readability formulas, which have most frequently been used, have been selected for the review of literature and as the reference for the development of KRF. All five formulas have mostly been developed and used for L1 or ESL learners.

1. The Flesch Reading Ease Readability Formula

The specific mathematical formula is: RE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

RE = Readability Ease

ASL = Average Sentence Length (i.e., the number of words divided by the number of sentences)

ASW = Average number of syllables per word (i.e., the number of syllables divided by the number of words)

The output, i.e., RE is a number ranging from 0 to 100. The higher the number, the easier the text is to read.

- Scores between 90.0 and 100.0 are considered easily understandable by an average 5th grader.
- Scores between 60.0 and 70.0 are considered easily understood by 8th and 9th graders.
- Scores between 0.0 and 30.0 are considered easily understood by college graduates.

2. The Dale-Chall Readability Formula

Step 1: Select a text sample of 100-150 words from an intermediate or advanced level text.

Step 2: Compute the average sentence length by dividing the number of words by the number of sentences.

Step 3: Compute the percentage of words not on the list of 3,000 familiar words.

Step 4: Compute the following equation:

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Raw Score = 0.1579 PDW + 0.0496 ASL + 3.6365
Raw Score = Reading Grade of a reader who can answer one-half of the test questions on the passage.
PDW = Percentage of Difficult Words
ASL = Average Sentence Length in words
Step 5: Use the following score to get the Adjusted Score.

RAW SCORE	ADJUSTED SCORE
4.9 and Below	Grade 4 and Below
5.0 to 5.9	Grades 5 - 6
6.0 to 6.9	Grades 7 - 8
7.0 to 7.9	Grades 9 - 10
8.0 to 8.9	Grades 11 - 12
9.0 to 9.9	Grades 13 - 15 (College)
10 and Above	Grades 16 and Above (College Graduate)

3. The Gunning's Fog Index (or FOG) Readability Formula

Step 1: Take a sample passage of at least 100-words and count the number of exact words and sentences.
Step 2: Divide the total number of words in the sample by the number of sentences to arrive at the Average Sentence Length (ASL).
Step 3: Count the number of words of three or more syllables that are NOT (i) proper nouns, (ii) combinations of easy words or hyphenated words, or (iii) two-syllable verbs made into three with *-es* and *-ed* endings.
Step 4: Divide this number by the number or words in the sample passage. For example, 25 long words divided by 100 words gives you 25 Percent Hard Words (PHW).
Step 5: Add the ASL from Step 2 and the PHW from Step 4.
Step 6: Multiply the result by 0.4. The mathematical formula is: Grade Level = 0.4 (ASL + PHW)
where,

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ASL = Average Sentence Length (i.e., number of words divided by the number of sentences)
PHW = Percentage of Hard Words
The underlying message of The Gunning Fog Index formula is that short sentences written in Plain English achieve a better score than long sentences written in complicated language. The ideal score for readability with the Fog index is 7 or 8. Anything above 12 is too hard for most people to read. For instance, The Bible, Shakespeare and Mark Twain have Fog Indexes of around 6. The leading magazines, like Time, Newsweek, and the Wall Street Journal average around 11.

4. The Fry Graph Readability Formula

Step 1: Select 3 samples of 100-word passages randomly (eliminate the numbers from word count).
Step 2: Count the number of sentences in all three 100-word passages, estimating the fraction of the last sentence to the nearest 1/10th.
Step 3: Count the number of syllables in all three 100-word passages as follows.

	Number of Sentences	**Number of Syllables**
First 100 words		
Second 100 words		
Third 100 words		
Total		
Average		

Step 4: Enter the graph with Average Sentence Length and Number of Syllables. Plot dot where the two lines intersect. Area where dot is plotted signifies the approximate reading grade level of the content.
Step 5: If you find a great deal of variability, you can put more sample counts into the average as shown in the following.

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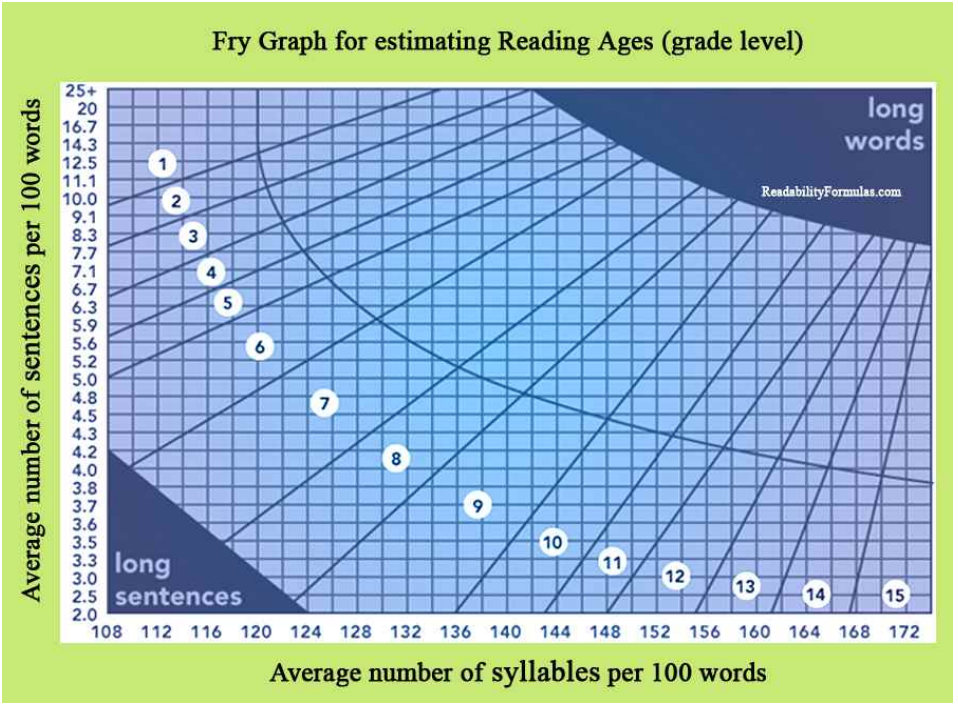

<Scores that appear in the dark area (long sentences and long words) are invalid.>

5. Lexiles

Lexiles are most widely adopted reading measure in use today(Metametrics, 2003). By using the Internet, anyone can find materials that have already been measured. A lexile is measured by the difficulty of the words and the complexity of the sentences in the text. Word difficulty is based on the frequency of words and sentence complexity is based on the length of sentences in a text. Readers get a score commonly between 200L and 1700L. A lexile measure is used for either the text or the reader. Students can choose appropriate books according to their lexile levels since many trade books are marked by lexile levels of screen display of the web-based lexile calculator as below (Burdick & Lennon, 2004).

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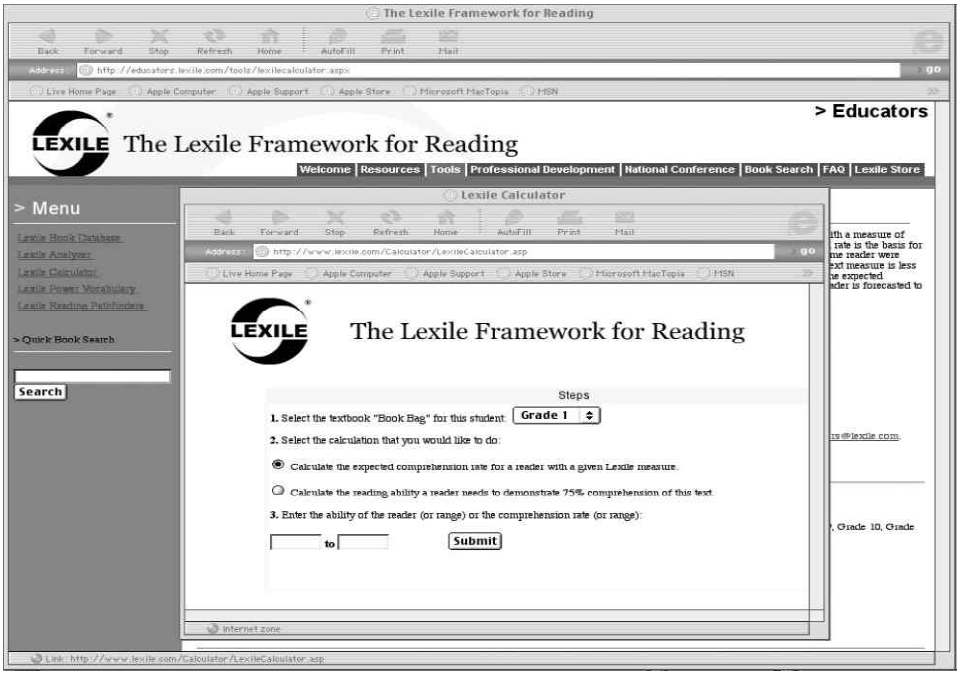

Readability formula makers, however, have long known that formulas have limitations and do not include factors as motivation or appropriateness (Fry, 2002). Text support factors, such as content, illustrations, curriculum, language structure, and format are not present in most readability formulas because those factors might be too complicated to be calculated by using a formula and it is likely to be hard to be applied to a wide range of texts and readers. In some Reading Recovery programs, the teachers took seven factors into consideration: book and print features, content, vocabulary, language and literary features, sentence complexity, text structure, and themes and ideas. However, since Reading Recovery program was mainly designed for students at the primary and remedial levels, the approach is hard to support a wide range of readers who have different reading abilities.

Compared to readability formulas for L1 or ESL students, the tools for EFL students are limited. Some studies(Brown, 1998; Carrell, 1987; Crossely, et al, 2008) have examined different applications to texts for L2 or EFL readers. Brown(1998) implied that traditional readability formulas are hard to account for L2 readers' variables.

Crossely et al. (2008) developed Coh-Metrix, a tool that measures English text readability for second language learners and better reflects psycholinguistic factors in reading comprehension than traditional readability formulas. However, since any of

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these tools do not reflect specific EFL situations in Korea, it is doubtful that they are valid when applied to texts for Korean EFL students. As a result, a tool for measuring readability reflecting the Korean national curriculum for English is needed to be developed.

III. METHODS

A survey was conducted to know the situation of English teachers and students using a reading measurement tool allowing educators to match students with appropriate texts. To develop the readability formula for Korean EFL students, two factors were taken into consideration to determine the difficulty level: lexical features and syntactic complexity. To create the appropriate vocabulary list measuring lexical factors and to identify average sentence length judging sentence complexity, English textbooks for elementary, middle, and high school were studied and elementary school textbooks were also analyzed to add core content words to the vocabulary list. A total of 7 English textbooks were used to examine if the results calculated by the developed readability formula reflect the proper grade levels: one English textbook for elementary students of grade six, three English textbooks for middle school students in their second year, and three English textbooks for high school students in their first year. Middle and high school English textbooks retaining a high market share were chosen to apply the formula and the results were compared to those of traditional readability formulas.

1. Participants & Questionnaire

The survey was conducted March 14 through April 25, 2010 among 200 Korean teachers of English and 305 Korean EFL students. Among the teacher respondents, the number of elementary school teachers was the most (52%), followed by high school teachers (28%). Students respondents from high school were 35%, followed by elementary school students (33%) and junior high school students (32%).

The questionnaires for English teachers were sent to 200 teachers through e-mail and 119 teachers of them replied (response rate: 59.5%). The students were chosen by quota sampling according to grade and city size of their residence. Most of the teacher respondents lived in metropolitan cities (57%), followed by small cities (27%) and country sides (16%). The percentage of the student groups was relatively even with 37% (metropolitan cities), 34% (small cities) and 30% (country sides). A total of 305 students responded to the questions (response rate: 100%). The questionnaire includes four questions about the use of reading measurement. Therefore, the four items and teachers'

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comments on developing a tool for measuring reading difficulty were chosen to be analyzed.

2. The Korean EFL Readability Formula (KRF)

The KRF is based on two measure units: average sentence length and the vocabulary list from the national curriculum, primary and secondary school English textbooks, and core content words from primary and secondary school textbooks. In most readability formulas, it has been proved that the most objective and measurable units are sentence length and vocabulary. It is why they are also used for KRF. The levels in KRF are categorized into twelve grades. First grade belongs to level 1, meaning that the text is appropriate for first graders to read. The KRF was developed with the support of one male professional in computer and math who joined this research team (two professors, three doctorate students, and two master degree students in English education).

1) Vocabulary

To create the vocabulary list for the KRF, we analyzed the national curriculum, frequent words from English textbooks for elementary, middle, and high school, core content words from elementary school textbooks and from American textbooks for elementary students. Frequent words and core content words were decided based on the national curriculum and by the research team of this study, who are considered as appropriate professionals in Korean EFL education.

2) Sentence length

To identify average sentence length judging sentence complexity, English textbooks for elementary, middle, and high school were analyzed: four English textbooks for elementary students from grade 3 to grade 6 and eighteen English textbooks (three for each grade) for middle and high school students. Middle and high school English textbooks retaining a high market share in 2009 were chosen. The list of the top-selling textbook publishing companies are shown in Table 1,

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TABLE 1

Top Five English Textbook Publishers (2009)

Rank	Middle School (Market Share)	High School (Market Share)
1	D (21.7%)	N (40.3%)
2	C1 (14.3%)	C1 (12.7%)
3	C2 (11.9%)	K (10.4%)
4	N (11.9%)	C3 (10.3%)
5	J (9.1%)	Y (7.9%)

3. Data Analysis

To analyze the questionnaire, four items regarding the tool to match students with their reading proficiency were chosen and frequency analysis was used. The vocabulary list and sentence length were categorized into twelve levels which reflect the national curriculum for English. The words for each grade level featured the vocabulary the national curriculum presents. Average sentence length was measured by calculating every sentence in one unit of each textbook from elementary to high school. The same textbooks for measuring average sentence length were used to examine if the newly developed readability formula matches to each grade level and the results were compared to those from the analysis of English textbooks using Lexile Analyzer and Flesch-Kincaid grade level.

IV. RESULTS

1. Questionnaire

In order to examine if English teachers and students learning English are interested in a tool for measuring reading difficulty, the percentage of their answers was investigated. As shown in Table 2, teachers said the most influential factor would be vocabulary (82%), followed by background knowledge (9%), length of sentence (6%) and grammar (3%). Since both grammar and sentence length reflect sentence complexity, vocabulary and sentence complexity are considered two of the most influential factors when teachers determine reading difficulty. Students also said the most influential factor was vocabulary (67%). The sentence complexity (23%) is considered important to students as well. Background knowledge was rather trivial factors for them to read (8%).

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TABLE 2

Most Influential Factors Determining Reading Difficulty

Groups / Reading difficulty	English teachers		Students	
	Frequency(N)	Proportion(%)	Frequency(N)	Proportion(%)
Vocabulary	98	82	205	67
Grammar	3	3	55	18
Sentence length	7	6	16	5
Background knowledge	11	9	25	8
Others	0	0	4	1
Total	119	100	305	100

Table 3 shows that most of the teachers said they consider students' reading ability first when they encourage students to read texts in English. 84% of the students also consider their reading ability.

TABLE 3

Students and English Teachers' Consideration on Student Reading Ability

Groups / Reading ability consideration	English teachers		students	
	Frequency(N)	Proportion(%)	Frequency(N)	Proportion(%)
Very much	65	55	80	26
A little	53	45	176	58
Hardly	0	0	46	15
No response	1	1	3	1
Total	119	100	305	100

When they choose books in English, only 14% percent of them considered grade level an important factor. As shown in Table 4, 25% of the teachers thought of the grade level of books when they help students choose books. It is implied that other factors are considered to be decisive.

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TABLE 4

Factors Determining Selection Criteria for Reading

Groups / Selection criteria for reading	English teachers		students	
	Frequency(N)	Proportion(%)	Frequency(N)	Proportion(%)
Interest	55	46	153	50
Front or back covers	23	19	66	22
Grade level	30	25	42	14
Genre	1	1	13	4
Age	10	8	29	10
No response	0	0	4	1
Double response	0	0	(-2)	(-1)
Total	119	99	305	100

As shown in Table 5, the participants have had few chances to use a tool for measuring reading difficulty. Only 2% of the teachers said 'yes' to the question about whether they used tools measuring students' reading ability and books' level or not, while 19% of the students said yes. The result implies that students have some chances to be exposed to the measuring tool in other educational institutes other than schools, while English teachers do not use the measuring tools at school.

TABLE 5

Question of whether teachers and students have used a tool for measuring reading difficulty

Groups / Using a tool for measuring reading difficulty	English teachers		students	
	Frequency(N)	Proportion(%)	Frequency(N)	Proportion(%)
Yes	2	2	57	19
No	117	98	247	81
No response	0	0	1	0
Total	119	100	305	100

Additionally, when asked to write comments on the development of the tool, English school teachers said that the tool for Korean EFL students is needed and it is also essential to develop a variety of suitable reading materials by grade levels.

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2. Vocabulary

Table 6 presents the number of words for each grade listed by Ministry of Education, Science and Technology of Korea.

TABLE 6

Number of Words for Each Grade

(The Revised 7th National English Curriculum, 2007)

Grade	New Words	Cumulative Words
3rd Grade	110	110
4rd Grade	120	230
5rd Grade	130	360
6rd Grade	140	500
7rd Grade	170	670
8rd Grade	280	960
9rd Grade	390	1,340
10rd Grade	450	1,790

* Words for 11th, 12th grade are not listed on the curriculum.

The curriculum also lists 1,790 words and recommends 75% of the words should be studied through each grade(The Revised 7th National English Curriculum, 2007). The basic word list is developed with the help of Nation's Most Frequent Word List, Academic Word List, General Service List, American National Corpus, and British Nation Corpus(The Revised 7th National English Curriculum, 2007).

However, 1,790 words are insufficient to comprehend authentic English reading texts as many researchers have insisted (Kim, 2007; Kim & Suh 2006). Nation argues that an 8,000 to 9,000 word-family vocabulary is needed to have 98% coverage of a text for native speakers of English(Nation, 2006). Also, L2 learners need to know 3,000 word-family vocabularies to have 95% comprehension for written texts(Laufer, 1989; Liu & Nation, 1985; Nation & Waring, 1997). Comparatively the size of vocabulary in Korean English curriculum is relatively small.

Korean students start to learn English at their third grade. English textbooks for elementary, middle and high school students are published by more than ten private companies which are granted permission to publish texts books by the government. The following table categorizes textbook schemes for each grade level.

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TABLE 7
English Textbooks

Grade	Textbook	Compulsory	Elective
7	Middle School English 1	O	
8	Middle School English 2	O	
9	Middle School English 3	O	
10	High School English	O	
	High School English Ⅰ	O	
11	Practical English Conversation		O
	English Reading and Writing		O
	High School English Ⅱ	O	
12	Practical English Conversation		O
	English Reading and Writing		O

In this research, the recommended and developed vocabulary size is 3980(see Table 8). Out of 3980 words, 3000 words were included in the list, which was developed in the national curriculum to promote extensive reading in Korean contexts. And about 1,000 core content words were developed more in this study. They can be called core, subject, or content vocabulary because they were extracted from subject matters, such as math, in elementary school contexts. To add up 1,000 core vocabulary to the new vocabulary list for Extensive Reading in Korean EFL contexts, this study analyzed subject textbooks in the elementary and secondary schools. The subjects include Mathematics, Korean Language, Social Studies, Physical Education, Music, Fine Arts, and Science. The rationale for including school subject vocabulary is that any teaching should build up on the previous experience of the learner, as they take into account the learners' existing knowledge of the subject matter and of the academic environment as well as their second language knowledge(Brinton, 2003). The following table shows the vocabulary size for each level.

TABLE 8
Number of Words for Each Level

Level	Grade	Words from the National Curriculum	Core Vocabulary	Grade-Semester	Total	Cumulative Words
1	1	80 (phonics)			80	80
2	2	100 (phonics)			100	180
3	3	110	80	1-1	190	370
4	4	120	80	1-2	200	570

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5	5	130	80	2-1	210	780
6	6	140	80	2-2	220	1000
7	7	170	100	3-1	270	1270
8	8	280	100	3-2	380	1650
9	9	390	100	4-1	490	2140
10	10	450	130	4-2	580	2720
11	11	500	130	5-1,2	630	3350
12	12	500	130	6-1,2	630	3980
		2,970	1,010		3,980	3980

3. Sentence Length

Sentence length judging sentence complexity was calculated using one English textbook for elementary students and three English textbooks for each grade in middle and high school. Since first and second graders at primary schools do not learn English, there is no English textbook. Therefore, sentence length for Sentence Level 1 and 2 is based on phonics. Alphabet letters, one word for pronunciation, and simple sentences belong to these levels. The average sentence length for the third grade textbook is more than two words (Level 3). As for Level 10 to 12, a total of 18 English textbooks for middle and high school students were chosen based on their market share. High School English, High School English I, and High School English Ⅱ were analyzed for Sentence Level 10, 11, and 12 respectively. Sentence length in Practical English Conversation and English Reading and Writing were not calculated because these two kinds of textbooks are used for additional elective English courses. Table 9 shows the results of average sentence length in school textbooks. The range in sentence length refers to the shortest sentence length average and the longest sentence length average in the textbooks.

TABLE 9

Average Sentence Length of English Textbooks

Sentence Level	Sentence Length	Reading Grade Level / Grade
1	$0 \leq Y \leq 1$ (alphabet to one word)	1
2	$1 < Y \leq 2$	2
3	$2 < Y \leq 2.5$	3
4	$2.5 < Y \leq 3.1$	4

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5	3.1 < Y ≤3.6	5
6	3.6 < Y ≤ 5	6
7	5 < Y ≤ 7	7
8	7 < Y ≤ 9	8
9	9 < Y ≤ 11	9
10	11 < Y ≤ 14	10
11	14 < Y ≤ 17	11
12	17 < Y ≤ 19	12
13	Exceeded SL	College Level or Above

4. The KRF

The KRF was developed based on the national curriculum for English. The grade level is calculated by two factors: vocabulary level and sentence level. The formula reflects the vocabulary list developed in this study, including the vocabulary suggested in the national curriculum to teach elementary, middle, and high school students in Korea and core content vocabulary developed in this study. Also, the formula reflects the average sentence length from English textbooks in use at school. The sentence levels are categorized into twelve grades. The first grade belongs to level 1, meaning that the text is appropriate for first graders to read. Therefore level 6 is appropriate for the sixth graders in the elementary school, level 8 for the second year students in the middle school and level 12 for the third year students in the high school.

The formula and the directions were developed as follows:

Step 1: Select a text sample of 100-150 words from the text.

Step 2: Compute the average sentence length by dividing the number of words by the number of sentences.

Step 3: Compute the following equations:

$$\frac{\sum_{1}^{N}(VL \times NWVL)}{TNW} = X$$

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$$\frac{\sum_{1}^{N}(SL \times SLSL)}{TNS} = Y$$

$$\left(\frac{TL \times X}{VL} + \frac{TL \times Y}{SL}\right) \times \frac{1}{2} = RGL$$

RGL = Reading Grade Level
VL = Vocabulary Level
NWVL = Number of Words in the Vocabulary Level
TNW = Total Number of Words
SL= Sentence Level
SLSL= Sentence Length in the Sentence Level
TNS = Total Number of Sentences
TL = Total Level
X= Reader's Vocabulary Level
Y= Reader's Sentence Level

Table 10 shows each level of vocabulary and sentence length and the final reading grade level.

TABLE 10

Table for the Reading Framework for Korean EFL Students

Vocabulary Level	Sentence Level	Number of Words	Sentence Length	**RGL**(Reading Grade Level /Grade)
1	1	80	0≤ Y≤ 1 (alphabet to one word)	1
2	2	100	1 < Y ≤ 2	2
3	3	190	2 < Y ≤ 2.5	3
4	4	200	2.5 < Y ≤3.1	4
5	5	210	3.1 < Y ≤3.6	5
6	6	220	3.6 < Y ≤ 5	6
7	7	270	5 < Y ≤ 7	7
8	8	380	7 < Y ≤ 9	8

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9	9	490	$9 < Y \leq 11$	9
10	10	580	$11 < Y \leq 14$	10
11	11	630	$14 < Y \leq 17$	11
12	12	630	$17 < Y \leq 19$	12
13	13	Words not on the list	Exceeded SL	College Level or Above

5. Validation

To examine if the results calculated by the developed readability formula reflect the proper grade levels, seven English textbooks for elementary, middle, and high school students were used and one lesson from each textbook was randomly chosen. Though reading parts in English textbooks were supposed to be analyzed, the dialogue parts in the elementary English textbook for six graders were used because it does not contain any sections for reading. In middle and high school textbooks, reading parts were randomly selected and used. Table 11 shows the results.

TABLE 11

Results Calculated by the Developed Formula

Textbooks	Vocabulary Level			Sentence Level			RGL (Reading Grade Level)		
Elementary English for Sixth Graders	4			6			5		
Middle School English 2	D	C1	C2	D	C1	C2	D	C1	C2
(Three textbooks gaining a high market share)	6	6	5	9	8	9	8	7	7
High School English	N	C1	K	N	C1	K	D	C1	C2
(Three textbooks gaining a high market share)	7	6	6	12	11	11	10	9	9

As shown in Table 11, all of the results are within plus or minus one grade level. The RGL of sixth grade is 5, meaning the textbook is appropriate for fifth graders. The low vocabulary level leads to the mismatching result. The dialogue section was chosen to be calculated because elementary English textbooks do not provide any reading sections;

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therefore, it is implied that the selected conversation part contains few words for reading. In middle school textbooks, two reading sections from two textbooks lead to the appropriate reading grade level, while only one lesson from one textbook matches with the grade, Since average sentence length is calculated by counting the sentences in only one lesson from the selected textbooks, this may have caused the mismatching results in the sentence level. In that case, we need to validate with more examples. Generally, for most of the textbooks in the result compared to RGL we made, the vocabulary levels show lower levels than those in RGA, while the sentence levels are higher than those in RGA. This implies the future textbooks need to include more vocabulary than former textbooks for the same level and need to present shorter sentences for the given level textbooks than before. In other words, it is suggested that Korean EFL students need to learn English with more vocabulary but easier structures with shorter sentences.

6. Comparison with other Measures

As shown in Table 12, the results of analyzing English textbooks using the Lexile Analyzer suggest that the range of the Lexile measure of the same grade is quite wide depending on textbook publishers and that the difficulty level of most of the English textbooks for middle school students is similar to that of the textbooks for grade 1 and 2.

TABLE 12

Results of Analyzing English Textbooks for Middle School Using the Lexile Analyzer and Flesh-Kincaid Grade Level(Suh, 2010)

Textbook Publishers	Lexile Analyzer						Flesch-Kincaid					
	Lexile			Number of words			Reading Level			Grade Level		
	Grade 7	Grade 8	Grade 9	Grade 7	Grade 8	Grade 9	Grade 7	Grade 8	Grade 9	Grade 7	Grade 8	Grade 9
D1	370L	300L	520L	196	238	328	89	93	88	2.5	1.9	3.2
D2	310L	410L	510L	104	246	464	93	87	84	1.2	2.9	4.7
J1	110L	280L	610L	90	183	335	96	96	91	1.6	1.4	3
J2	240L	660L	850L	127	388	339	96	94	80	1.4	2.8	4.4
C	220L	410L	670L	105	181	421	79	89	73	3.7	2.7	5.6

The range of the Lexile measure for eighth graders in Korea is compatible with that of the Lexile measure for second to fourth graders in the US. The following table shows the

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text examples for grade 1 to 6 presented by the Lexile Map. The text examples for second graders and fourth graders are quite different in vocabulary and sentence complexity. The text example for fourth graders appears to be much more difficult than the example for second graders. Therefore, it is inferred that the Lexile measure does not seem to be accurate to measure the readability of textbooks for Korean students because the textbooks reflect the Korean national curriculum for English. In this sense, a new tool for measuring readability based on the national curriculum is needed for Korean EFL students.

TABLE 13

Text Examples for Grade 1 to 6 from the Lexile Map

Grade	Book Title	Content
1	Play Ball, Amelia Bedelia	"I know there is a uniform here," said Amelia Bedelia. And there was one. She took a nip here and a tuck there. Soon that uniform was just right
2	The Best Way to Play	"My dad said there are too many toys these days,' said Kiku. "So, what's wrong with toys?" I said. We sat around and felt sad together. Just then, Andrew came running toward us. "I got the game," he said. "Let's go to my house and play it!" "Let's go!" we shouted.
3	Encyclopedia Brown, Boy Detective	In the morning he made up his mind. He would go into the detective business and help people. He wouldn't wait until he grew up. It was summer and school was out. He could begin at once. Encyclopedia got out of bed and searched through his closet. He dug out a toy printing press, a Christmas gift from his Uncle Ben two years ago. As soon as Encyclopedia finished breakfast, he printed fifty handbills. When the ink was dry, he put the handbills in all the mailboxes in the neighborhood.
4	If You Sailed on the Mayflower in 1620	Plants called herbs were the medicine of the Pilgrims. When spring came, the women planted herbs in their gardens. Suppose you cut yourself. Your mother would make a medicine from the wild daisy. She would mix it with animal fat and smear it on your cut. Suppose you had a headache. Your mother would mix ground-up sage with fat and cornmeal. You would have to eat it, even if you hated the taste. Rose leaves and the fruit of the rose, called rose hips, were said to be good for almost anything.
5	Pacific Crossing	Mr. Ono was in the garden, playing a round of backyard golf. The golf club was rusty, and his single golf ball was chipped and yellow as an old tooth. "I'm on vacation. I can't worry about money," he said, concentrating on his putt and the dent in the earth twenty feet away. He swung the club, and the ball raced like a mouse under a cabbage leaf. He looked at the boys and said. "I need practice. Give me a couple of hours, and you'll see."

교보문고 KYOBO Book Centre

6	Julie of the Wolves	Propped on her elbows with her chin in her fists, she stared at the black wolf, trying to catch his eye. She had chosen him because he was much larger than the others, and because he walked like her father, Kapugen, with his head high and his chest out. The black wolf also possessed wisdom, she had observed. The pack looked to him when the wind carried strange scents or the birds cried nervously. If he was alarmed, they were alarmed. If he was calm, they were calm. Long minutes passed, and the black wolf did not look at her.

Though the average sentence length for three grades are the result of counting sentences from more than one textbook, only one lesson from each textbook was selected to be calculated. There is a high possibility that more lessons from one textbook result in higher validity.

V. CONCLUSION

The aims of the paper are to present the model of developing the Reading Framework for Korean EFL students and to demonstrate its appropriateness for elementary, middle, and high school students learning English based on the national curriculum. A survey was conducted to examine if a tool for measuring text readability is necessary. When asked to write comments on the development of the tool, English school teachers said that the tool for Korean EFL students is needed and it is also important to create a variety of suitable reading materials by grade levels based on the developed readability tool. Like traditional readability formulas--e.g, Flesch-Kincaid grade level(Kincaid et al., 1975) and The New Dale-Chall Readability Formula(Chall & Dale, 1995), the newly developed readability formula for Korean EFL students(KRF) is based on two factors: lexical or semantic features and syntactic complexity. The commonly used readability formulas for L1 learners showed relatively little constancy in the measures when analyzing English textbooks in Korea(Suh, 2010). However, the grade levels calculated by the KRF are, to some extent, congruous to those of English textbooks since both the textbooks and the tool reflected the national curriculum. English educators have had difficulties in matching EFL students to appropriate texts when they encourage students to read books in English. If students are informed of their reading proficiency and appropriate texts for them, few of them will be frustrated when they attempt to read books in English. This study, therefore, tried to show the process of developing Korean EFL reading framework and the readability formula for Korean EFL learners. This study is especially valuable since this is the first attempt to make a readability formula for Korean EFL learners. It is hoped that this formula will be helpful to guide Korean EFL

교보문고 KYOBO Book Centre

learners for more effective reading and to develop a more appropriate reading system in Korean EFL contexts in the future. Finally, it is hoped that the future research will be conducted about the actual use of the KRF developed in this study and other better reading formulas will be made for better English education in Korea.

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