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Readability Analysis of Texts in College English Textbooks and Reading Passages in CET-6

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Abstract

English textbooks play an indispensable role in classroom teaching and learning. Teachers carry out different activities based on them and students also depend on them to enlarge their knowledge and prepare for an examination. Thus it is of great importance to select textbooks with proper text readability. What's more, College English Tests are a criterion to evaluate students' achievements in English in college. There have been some studies on the text readability of textbooks and test papers, however, there are very few studies on the consistency of the readability of the texts from English textbooks with that of College English Test papers. To make up for the gap, this research makes a comprehensive analysis of the texts in volumes 3 and 4 of New Target College English Integrated Course and the reading passages in College English Test band 6 from July 2020 to June 2022 in terms of text readability. Flesch Reading Ease formula and other five commonly used readability formulas are employed as the detection tools to study the text readability of texts from textbooks and papers. The research aims at finding out the characteristics of the text readability of the two volumes and test papers and the differences between them. Hoping that this study can provide some suggestions for teachers as well as students who use the same textbooks.

Subject Areas

Linguistics

Keywords

Text Readability, English Textbooks, Volume 3, Volume 4, CET-6

1. Introduction

English textbooks serve as a basic tool for teachers to conduct teaching activities

in classroom and the main source for students to gain English knowledge and prepare for the examinations. Therefore, textbooks with proper text difficulty matter a lot in classroom teaching and learning. Text readability is a crucial indicator to measure text difficulty. An analysis of text readability of the texts would help teachers to choose the right English textbooks and supplemental materials.

One of the commonly used methods to test students' knowledge level is to take an examination. College English Test (CET) is a national standard test held by the Ministry of Higher Education to objectively and correctly measure non-English major students' English abilities. It has two levels: Band 4 and Band 6, both of which are held twice a year, usually on one of the Saturdays in June and December with Band 4 in the morning and Band 6 in the afternoon. The full score of the test is 710, including listening, reading, writing and translation sections. Those who get less than 425 are considered failures and students can take Band 6 only when they have passed Band 4.

College English is a compulsory course in most colleges and universities in China. It usually lasts for four semesters and one of the teaching objectives is to help students to pass College English Tests. Thus it is significant for teachers to choose textbooks which are at an appropriate difficulty level, as text difficulty can greatly influence students' acquisition of knowledge and mastery of skills.

2. Literature Review

For Chinese students, English textbooks are providers of knowledge input in classroom teaching. They help students understand the target language, learn autonomously and prepare for the examinations. Alderson considered text readability as a variable in influencing reading a text [1]. According to the Longman Dictionary of Language Teaching & Applied Linguistics, text readability is defined as the degree to which a text is easy to read [2]. Wang pointed out that learning materials of high difficulty could go beyond information processing ability of the learners and lead to their failure in reading, but learning materials which were too simple would bore the learners [3]. Thus choosing textbooks with the right text readability is of great importance.

2.1. Studies on Readability

Studies on readability can be traced back to the 1920s. Thorndike firstly introduced a text readability method in his book "Teacher's Word Book" [4]. He summarized the common words in the course book into a vocabulary table according to their frequencies and then used the difficulty level of the table to judge the text readability. Later, great efforts were devoted to seeking objective approaches to accessing the readability level of a text. Rudolf Franz Flesch [5], Dale · Chall and Kasule. Dale · Chall [6], Gunning [7], Senter and Smith [8], G · Harry McLaughlin [9] developed different readability formulas and applied them to different materials to calculate the readability level. Fry pointed out that

readability measurement had been used in fields such as education, business, court cases, government and publishing industry [10].

2.1.1. Studies on the Readability of Textbooks

Researchers and scholars were all interested in investigating the readability of the textbooks to judge whether the textbooks were compiled and selected reasonably or whether the textbooks were well matched with the reading level of the potential readers. Thus there are many studies on text readability of textbooks of different levels and subjects.

Johnson studied the readability levels of fifty-six elementary social study textbooks published between 1972 and 1976 with the help of readability formulas. He found that there was a trend towards lowering the reading difficulty of the textbooks although such trend did not make the texts easier for elementary school students to comprehend [11].

Owu-Ewie investigated the readability level of comprehension passages in English textbooks in Junior High School in Ghana. He used readability formulas to analyze the reading difficulty and age levels of the passages and found that most of the passages were above the reading level of the intended learners. Based on his study, some suggestions were offered to improve the compilation of the textbooks to make them more readable [12].

Zhang conducted a comparative study of the text readability among four volumes of college English textbooks. She found that the compilation of the four textbooks did not follow the rule of developing from easy to difficult. Volume 2 was more difficult than Volume 3 in terms of average word length, average sentence length and scores derived from readability formulas [13].

In general, the literature of textbook readability studies has revealed that the reading difficulty of texts is often inappropriate for the intended readers. Whether the readability level of the texts matches with the reading level of the learners or not is of vital importance as it can greatly influence their understanding of the texts. In addition, the application of various readability formulas to study the readability of the texts suggests that it is a quick approach to estimating the readability of the texts.

2.1.2. Studies on the Readability of Examinations

There are extensive studies on textbook readability, however, the studies on examination readability are limited in scope.

Gu&Guan made a sampling study on the readability of reading comprehension passages in CET tests and that of college English textbooks. They compared the readability of reading comprehension passages of CET-4 and CET-6 in June 1990, 1995 and 2000 and found that the average Flesch readability score became lower with time passing by. That is to say the reading comprehension passages in CET tests were becoming more and more difficult to understand. They also discovered that the readability of passages for intensive reading and extensive reading from college English textbooks was basically the same and the readabili-

ty of passages among the textbooks did not bear significant difference [14].

Kim & Hyun made an analysis of text readability of high school English Ⅱ textbooks and that of the reading passages in College Scholastic Ability Test. With the help of the the Flesch Reading Ease and Flesch-Kincaid Grade Level formulas, they found that the textbooks were more understandable than the reading passages in the tests. The tests had been getting more and more difficult with time passing by and the readability level were comparatively higher than that of the textbooks, thus the textbooks were not appropriate to be used for preparing for the test [15].

Wang analyzed the readability of reading texts in English textbooks for Senior High School and comprehension passages of National Matriculation English Test in Jiangsu province from both unidimensional and multidimensional perspectives and made a comparison of their readability. She found that English textbooks were at a standard readability level while the papers were at a fairly difficult level. She also discovered that English textbooks for senior high school 1 & 2 were easier than papers and English textbooks for senior high school 3 were most significant with papers in terms of text readability and could be used for preparation for the exams [16].

2.2. Classic Readability Formulas

Readability formulas serve as a tool to calculate text difficulty. According to Klare, readability formulas referred to mathematical equations employed to predict the level of reading competence necessary for understanding a particular text and to provide an index of probable difficulty of a text for a reader [17]. They have two advantages: economic and time-efficient, without the readers' participation, comparatively objective through quantitative calculation.

Readability formulas were originally developed in the United States in the 1920s. In 1923, Lively and Pressey published the first readability formula. Since then, readability formulas have been developed in quantity. However, only a few of them are generally accepted and frequently used nowadays. The most commonly used ones are: Flesch Reading Ease, Flesch-Kincaid Grade Level, Automated Readability Index, Coleman-Lian Readability Score, Gunning Fog, and the SMOG Readability Index.

Flesch Reading Ease formula, developed by Flesch in 1948, is regarded as the most frequently and widely used readability formula. Its calculation formula is:

$$\text{Flesch Reading Ease Core} = 206.835 - 84.6\text{ASW} - 1.015\text{ASL}$$

$$\text{ASW} = \text{average number of syllables per word}$$

$$\text{ASL} = \text{average sentence length}$$

The score of the formula ranges from 0 to 100 and can be divided into 7 degrees (more information can be found in **Table 1**). The higher the score is, the easier the reading material is to be read and the lower the score is, the more difficult the reading material is to be read.

Kincaid and his team developed the Flesch-Kincaid Reading Grade Level. Different from Flesch Reading Ease formula, Flesch-Kincaid Reading Grade Level can produce a result of a grade level,which makes it easier for teachers, parents and others to select appropriate reading materials for the children. Therefore, it is extensively used to get a grade level of a specific text or reading material. Its calculation formula is:

$$\text{Flesch-Kincaid Reading Grade} = 0.39\text{ASL} + 11.8\text{ASW} - 15.59$$

ASW = average number of syllables per word

ASL = average sentence length

Flesch-Kincaid Reading Grade Level corresponds to grade-school level education required by American Primary and Secondary schools. As is shown in Table 2, if

Table 1. Flesch reading ease value.

Score	Estimated Reading Grade	Description
0 - 30	College graduate	Very difficult to read, best understood by university graduate.
30 - 50	College student	Difficult to read.
50 - 60	10th - 12th grade	Fairly difficult to read.
60 - 70	8th&9th grade	Standard English. Easily understood by 13 to 15-year-old students.
70 - 80	7th grade	Fairly easy to read.
80 - 90	6th grade	Easy to read. Conversational English for consumers.
90 - 100	5th grade	Very easy to read. Easily understood by an average of 11-year-old students.

Table 2. Readability index relating to grade-level and age.

Score	Estimated Reading Grade-level	Estimated Age
6	6th grade	11 - 12
7	7th grade	12 - 13
8	8th grade	13 - 14
9	High school freshman	15 - 16
10	High school sophomore	16 - 17
11	High school junior	17 - 18
12	High school senior	18 - 19
13	College freshman	19 - 20
14	College sophomore	20 - 21
15	College junior	21 - 22
16	College senior	22 - 23
17	College graduate	24+

the grade level is 7.0, it means that students in the 7th grade can read the text. The higher the score is, the higher grade it requires or the more difficult the material is to be read and the lower the score is, the lower grade it requires or the easier the material is to be read.

The Automated Readability Index which is similar to Flesch-Kincaid Reading Grade Level also corresponds to grade-school reading level of American Schools. According to Table 2, if the Automated Readability Index score of a text is 7.0, it corresponds to understandable of 12 to 13-year-old 7th grade students. Its calculation formula is:

$$\text{Automated Readability Index} = 4.71\text{AWL} + 0.5\text{ASL} - 21.43$$

AWL = average word length

ASL = average sentence length

The Coleman-Lian Readability Score is another formula giving scores corresponding to grade levels. As is shown in Table 2, if the Coleman-Lian Readability Score of a text is 7.5, it means that the text is understandable to American 7th to 8th students. Its calculation formula is:

$$\text{Coleman-Lian Readability Score} = 0.0588\text{L} - 0.296\text{S} - 15.8$$

L = average number of letters of every 100 words

S = average number of sentences of every 100 words

The Gunning FOG Readability formula is developed in 1952 by Gunning, an American textbook publisher. Thus the value is based on magazines and daily newspapers and the score roughly reflects the number of formally educated years it requires to get to a certain understandable level. Its calculation formula is:

$$\text{Gunning FOG Readability Index} = (\text{ASL} + 100 * \text{PCW}) * 0.4$$

ASL = average sentence length

PCW = percentage of complex words (percentage of polysyllabic words)

The value of the Gunning FOG Readability Index ranges from 6 to 17, and each index corresponds to a certain number of formal education needed to understand a text. According to Table 2, if the Gunning FOG Readability Index value is 14, it means the U.S. college sophomores (about 20-year-old college second year students) can understand the text. Therefore, texts with a FOG Index value of 7 to 8 are considered as ideal reading materials for most people and anything with a FOG Index value over 12 is hard for the majority of people to read.

SMOG Readability Index, developed by G · Harry McLaughlin, is similar to the FOG Index. It also roughly reflects the years of formal education it needs to understand a certain text. Its calculation formula is:

$$\text{SMOG} = \sqrt[1.0430]{\text{number of polysyllables} * \frac{30}{\text{number of sentences}}} + 3.1291$$

Polysyllables refer to words with more than three syllables.

3. Methodology

3.1. Research Questions

It can be found that most readability studies have focused on the readability level of the passages in textbooks. Several studies have investigated the readability of examinations. Not many studies on the relationship between the readability of the passages in the textbooks and that in examinations can be found.

This thesis analyzes and compares the readability level of the texts in volumes 3 and 4 of New Target College English Integrated Course (2nd edition) and that of the reading passages in CET-6 from July 2020 to June 2022. It also aims to examine the consistency between them so as to provide some practical suggestions for teachers. Research questions of the thesis are listed as follows:

1) What are the characteristics of readability of the passages in volumes 3 and 4 of New Target College English Integrated Course (2nd edition)?

2) What are the characteristics of readability of the reading passages in CET-6?

3) How consistent are the tsxts in volumes 3 and 4 of New Target College English Integrated Course with the reading passages in CET-6 in terms of text readability?

3.2. The Corpora

New Target College English Integrated Course (2nd edition) volumes 1 to 4 are used as the main textbooks in the four semesters in Zhejiang Yuexiu University, one volume one semester. Most students can pass CET-4 but very few can pass CET-6 in the first year. Students are encouraged to work hard in their second year and try to pass CET-6. Therefore, volume 3 and volume 4 used in the second year may be more useful in helping them pass CET-6 and they are used as the corpora for study.

English textbooks are used as one of the main sources to improve students' reading ability and the ability to make the right judgement of a written text. Moreover, college English textbooks are the materials which are of great importance for college students to prepare for College English Test. New Target College English Integrated Course is a series of textbooks published by Shanghai Foreign Language Education Press and edited by Liu Zhengguang as the chief editor. Each volume contains 8 units and each unit includes a rich array of learning activities which can develop students' basic language skills and cultural connotations and cultivate their humanistic spirit and accomplishment. This thesis investigates text A which is the main component adopted in class in each unit in volumes 3 and 4 used in the third and fourth semester.

College English Test includes four parts, writing, listening, reading and translation. Listening and reading take up 70% of the total score, that is 248.5 respectively. Writing and translation take up 30%, that is 106.5 respectively. There are four passages in the reading part, a cloze test, a fast reading passage and two careful reading passages. This thesis investigates the three reading passages because the cloze test focuses more on the vocabulary and grammar. College English Test is

held twice a year (three times in year 2020 because of the COVID-19). There are three sets of papers (only one set of paper in July and two sets in September, 2020) in each test, together there are six different sets of papers a year. The thesis intends to study the papers from July 2020 to June 2022 and each reading passage is regarded as a corpus. Thus the corpora includes 45 examination passages and 16 reading passages.

3.3. Instruments

WE Research Platform is used to help to analyze the text readability. It is a one-stop digital service platform developed by Shanghai Foreign Language Education Press. The platform aims at helping national college teachers and students, providing multiple teaching and researching resources to satisfy users' needs for teaching, testing, training and researching.

Each text is input into the WE Platform to be analyzed and the output data include the scores of six commonly used readability formulas and eight types of text features. More information can be found in Figure 1 downloaded from the platform.

The six readability formulas are: Flesch Reading Ease, Flesch-Kincaid Grade Level, Automated Readability Index, Coleman-Liau Readability Score, Gunning Fog and SMOG. Flesch Reading Ease Formula, based on two variables, the length of words and the length of sentences, is now considered as one of the

Figure 1. Output data from WE research platform.

leading readability indices. It is used alone as a means to make comparisons between textbooks and test papers in this thesis. The three formulas, Flesch-Kincaid Grade Level, Automated Readability Index and Coleman-Liau Readability Score, all correspond to grade-school levels. The two formulas, Gunning Fog and SMOG, both roughly reflect the years of formal education it needs to understand a certain text. The grade-school level and the years of formal education have the same meaning, a 7th grade student means he has had seven years of formal education. Thus the mean of these five scores is analyzed as a whole and is named Readability Index 1.

3.4. Procedures

All the 45 passages from the CET-6 papers and the 16 passages from textbooks are collected and processed to analyze the text readability. To ensure the accuracy of the analysis, each text has been proofread twice. The titles, questions followed, Chinese tips for words and notes are all excluded.

Firstly, the 45 passages are downloaded and stored into a database by using Microsoft Word. Likewise, the 16 passages are also collected and stored into a database. Secondly, each text respectively is copied and pasted to the web version (https://we.sflep.com/research/ReadingEase.aspx) of WE Research Platform to get the 6 scores of different readability formulas of each text. Scores obtained are stored into Microsoft Excel to finally get Flesch Reading Ease score, Readability Index 1. Thirdly, mean scores and standard deviations related to reading passages from textbooks and CET-6 on readability indexes are calculated with the help of Microsoft Excel. Significance of differences between reading passages from textbooks and CET-6 are computed by SPSS. All the statistics collected are for specific discussion about text readability of textbooks and CET-6. Finally the statistical data are analyzed to present a clear view of the characteristics of text readability of textbooks and CET-6. What's more, comparisons are made to analyze how consistent the reading passages in textbooks are with those in CET-6 in terms of text readability.

4. Results and Discussion

4.1. Flesch Reading Ease Index

The Flesch Reading Ease formula is one of the most commonly used approaches to measuring text readability. It can make the difficulty level of different reading materials in different categories clear at first glance and can be applied in selecting texts for students to read.

4.1.1. Flesch Reading Ease Index of textbooks

Each text is input into the readability detection tool on WE Research platform and the Flesch Reading Ease index is calculated. **Table 3** shows the reading ease score (RES) of the 16 texts from volumes 3 and 4 of New Target College English Integrated Course (2nd edition). In addition to RES of each text, the mean RES of

Table 3. Reading ease score of textbooks.

Textbook	T1	T2	T3	T4	T5	T6	T7	T8	Mean	SD
Volume 3	59.10	53.03	44.97	56.32	68.32	66.75	51.33	46.99	55.85	8.54
Volume 4	54.99	62.35	33.05	45.12	49.88	67.42	55.06	40.28	51.02	11.36

Mean score of 16 texts = 53.44; SD of the scores of the 16 texts = 10.03.

each volume and two volumes are also calculated. Moreover, the numerals in column entitled "SD" represent the standard deviation of the measure of the RES of the texts. A large standard deviation indicates the texts have a large variation in terms of text difficulty level, that is to say, some texts may be very difficult and other texts may be very easy. According to Guo and Lu, while reading a very difficult text, the students need to look up the dictionary very often and may be discouraged. On the contrary, students may feel unfulfilled if a text is too easy [18]. As is shown in Table 3, the mean RES of the texts in volume 3 and volume 4 is 55.85 and 51.02 respectively, which means the difficulty of the texts in volume 3 and volume 4 is at a fairly difficult level (see Table 1). The standard deviation of the scores of the texts in volume 3 and volume 4 is 8.54 and 11.36 respectively, meaning that the variation in regards to the reading difficulty of the texts in volume 3 is not so large and that of volume 4 is slightly larger.

According to Gu & Guan, the ideal reading model of textbooks should follow the principle of graded teaching [14]. Firstly, the text readability within one textbook should be at the same level. For example, T1, T2, T4, T7 in volume 3 are all at a fairly difficult level. Meanwhile, the standard deviation of volume 3 is 8.54, showing that the majority of these texts have low variation in terms of reading difficulty. Secondly, the readability levels of different volumes should have a significant difference. Though the mean RES of volume 3 is 55.85 and that of volume 4 is 51.02, they are both at the level of fairly difficult. However, the mean RES of volume 4 is very near to 50, which belongs to the category of difficult. The lower the RES is, the more difficult the passage is, that is to say, the texts in volume 4 as a whole are more difficult than those in volume 3, implying that they go from easy to difficult.

4.1.2. Flesch Reading Ease Index of CET-6

Table 4 presents the RES of the 45 passages in CET-6 from July 2020 to June 2022 and related statistics.

As can be seen from Table 4, the mean RES of 45 reading passages is 41.73, suggesting a readability level of difficult. The standard deviation of the scores of 45 passages is 7.71, implying that the variation in terms of reading difficulty level of all the texts is small.

According to the standard deviation of the RES of reading passages in each test, the readability levels of tests 1 & 2 in Jul. 2020 and Dec. 2021, tests 2 & 3 in Dec. 2020, all the three tests in Jun.2021 and 2022 are within narrow changes with a standard deviation below 10. While those in test 3 in Jul. 2020 and Dec. 2021,

Table 4. Reading Ease score of CET-6.

Year	Test	P1	P2	P3	Mean		SD
2020.7	T1	37.48	43.63	28.37	36.49	37.68	7.68
	T2	40.72	38.41	35.93	38.35		2.40
	T3	33.74	56.88	23.97	38.20		16.90
2020.12	T1	32.00	54.85	41.29	42.71	42.77	11.49
	T2	45.89	33.35	44.42	41.22		6.86
	T3	41.45	44.89	46.75	44.36		2.69
2021.6	T1	32.68	45.16	32.04	36.63	44.38	7.40
	T2	51.07	50.25	46.41	49.24		2.49
	T3	50.20	41.20	50.37	47.26		5.25
2021.12	T1	49.21	39.93	46.39	45.18	44.14	4.76
	T2	41.69	38.67	41.77	40.71		1.77
	T3	61.10	41.62	36.85	46.52		12.85
2022.6	T1	44.78	38.14	48.39	43.77	39.67	5.20
	T2	34.68	45.48	32.71	37.62		6.88
	T3	34.68	45.48	32.71	37.62		6.88
	Mean	42.09	43.86	39.22	41.73	41.73	2.34
	SD	8.34	6.36	8.06	4.19	2.94	

Mean score of 45 passages = 41.73; SD of the scores of 45 passages = 7.71.

test 1 in Dec.2020 are within large changes with a standard deviation of above 10. In addition, the RES of the passages varies from 23.97 to 61.10 with a big range, which means that some passages are very difficult to read while some passages are at the level of difficult, fairly difficult or of standard difficulty.

The mean RES of each test varies from 36.49 to 49.24 without a big range, at the level of difficult. The mean RES for each time varies from 37.68 to 44.38 without a big range. The standard deviation of the mean RES of each time is 2.94, indicating that the reading difficulty level of CET-6 stays relatively stable over the years. However, the mean RES of each time is under 45, indicating the reading comprehension part in CET-6 is difficult. Therefore, it is a scientific approach to improving the reading difficulty level of CET-6 while keeping it at a relatively stable level.

4.1.3. A Comparison of Flesch Reading Ease Index between Textbooks and CET-6

Comparing Table 3 with Table 4, it can be seen that the mean RES of textbooks is 53.44 while that of CET-6 is 41.73. The score of 53.44 corresponds to the readability level of fairly difficult while the score of 41.73 corresponds to the readability level of difficult. An evaluation of the RES shows that the reading passages

in CET-6 are more difficult than texts in the textbooks. Due to the features of textbook selection and compilation, the readability level of textbooks is supposed to rise across volumes. Following this principle, texts in volume 3 should be easier than those in volume 4. Meanwhile, the mean RES of CET-6 is much lower than that of texts in volume 3 and volume 4 respectively, indicating that the reading comprehension is more difficult than texts in each volume as a whole.

There is no indication showing whether the differences between the text readability of different volumes and that of CET-6 is significant or not. Therefore, it is decided to use the statistical device SPSS to compute the significance of the differences between the mean RES of each volume and that of CET-6. The results are presented in Table 5.

As presented in the table, the difference between the mean RES of volume 3 and that of CET-6 is statistically significant ($t = 4.704$, $p < 0.05$); the difference between the mean RES of volume 4 and that of CET-6 is statistically significant ($t = 2.916$, $p < 0.05$). It can be concluded that the reading passages in CET-6 are more difficult than those in textbooks. Table 6 provides a specific distribution of the difficulty levels of passages in textbooks and CET-6 from July 2020 to June 2022 and shows the relationship between their readability more clearly.

It demonstrates that the readability of all the examinations is at the level of

Table 5. Significance of differences between the mean RES of textbooks of each volume and that of CET-6.

Text Resource	Mean	SD	T	P
Volume 3	55.85	8.54	4.704	0.000
CET-6	41.73	7.71		
Volume 4	51.02	11.36	2.916	0.005
CET-6	41.73	7.71		

Table 6. Distribution of the difficulty levels of textbooks and CET-6.

Reading Ease Score	Style Description	Textbook	CET-6
0 - 30	Very Difficult		
30 - 50	Difficult	T3-3, T8-3, T3-4, T4-4, T5-4, T8-4	Jul. 2020, Dec. 2020, Jun. 2021, Dec. 2021, Jun. 2022
50 - 60	Fairly Difficult	T1-3, P2-T3, T4-3, T7-3,T1-4, T7-4	
60 - 70	Standard	T5-3, T6-3, T2-4, T6-4,	
70 - 80	Fairly Easy		
80 - 90	Easy		
90 - 100	Very Easy		

*T1-3 refers to text 1 in volume 3, T1-4 refers to text 1 in volume 4.

difficult. Of the 16 texts from volumes 3 and 4, only 6 texts, 2 in volume 3 and 4 in volume 4, are at the same level with the examinations. The rest 10 texts are all below the level of difficult, 6 at the level of fairly difficult and 4 at the level of standard. Therefore, most of the texts in volumes 3 and 4 are easier for the preparation for CET-6, some of the texts can be a criterion for the selection of reading materials for CET-6.

4.2. Readability Index 1

The scores got from the five formulas—Flesch-Kincaid Grade Level, Automated Readability Index, Coleman-Liau Readability Score, Gunning Fog and SMOG all correspond to grade-school levels or the years of formal education required to understand the reading material. Thus the mean of these five scores is analyzed as a whole and is named Readability Index 1.

4.2.1. Readability Index 1 of Textbooks

Each text is input into the readability detection tool on WE Research platform to get the scores of the five formulas and the mean of these five scores is calculated. Table 7 shows the Readability Index 1 (RI1) of the 16 texts from volumes 3 and 4 of New Target College English Integrated Course (2nd edition). In addition to RI1 of each text, the mean RI1 and the standard deviation of each volume and two volumes are also calculated.

As is shown in the table, the mean RI1 of the texts in volume 3 and volume 4 is 11.41 and 12.34 respectively, which means the grade-level of the texts in volume 3 is 11th grade and volume 4 is 12th grade, equivalent to the reading level of about 17-year-old and 18-year-old American teenagers (see Table 2). The standard deviation of the scores of the texts in volume 3 and volume 4 is 1.88 and 2.36 respectively, meaning that the variation in regards to the grade-level of the texts in volume 3 is small and that of volume 4 is slightly larger.

Although there is no large variation, the score of the index is quite low, thus there are great differences in appropriate reading level among the passages. For example, T5 in volume 3, with the lowest RI1 score of 8.51 in volume 3, is fit for 8th grade students aged about 14. While T3, with the highest RI1score of 13.48, is fit for 13th grade students aged about 20. The difference in volume 4 is even greater. The lowest score is 8.92 in T6, appropriate for about 14-year-old American middle school students. The highest score is 15.67 in T3, appropriate for about 22-year-old American college juniors. The large gap among the appropriate reading levels is not scientific in compiling textbooks.

Table 7. Readability index 1 of textbooks.

Textbook	T1	T2	T3	T4	T5	T6	T7	T8	Mean	SD
Volume 3	10.49	12.44	13.48	11.90	8.51	8.91	12.64	12.88	11.41	1.88
Volume 4	11.65	10.05	15.67	13.06	12.87	8.92	11.22	15.26	12.34	2.36

Mean score of 16 texts = 11.87; SD of the scores of the 16 texts = 2.12.

4.2.2. Readability Index 1 of CET-6

Table 8 presents the RI1 of the 45 passages in CET-6 from July 2020 to June 2022 and related statistics.

As can be seen from Table 8, the mean RI1 of 45 reading passages is 13.93, suggesting a reading level of 21-year-old American college freshmen. The standard deviation of the RI1 of 45 passages is 1.40, implying that the variation in terms of reading level of all the passages is small.

According to the standard deviation of the RI1 of reading passages in each test, the reading levels of tests 1 & 2 in Jul. 2020 and Dec. 2021, tests 2 & 3 in Dec. 2020, all the three tests in Jun. 2021 and 2022 are within narrow changes with a standard deviation below 2. While those in test 3 in Jul. 2020 and Dec. 2021, test 1 in Dec. 2020 are within large changes with a standard deviation of above 2. The variation in terms of RI1 among the 45 passages is the same as that of RES. In addition, the RI1 of the passages varies from 10.60 to 16.54 with a big range, which means that some passages are very difficult, fit for about 23-year-old American college seniors or graduate students to read, while some passages are relatively easy, fit for about 17-year-old American high school sophomores.

The mean RI1 of each test varies from 12.56 to 15.56 with a big range, equivalent to the reading level of about 18-year-old American high school seniors and

Table 8. Readability index 1 of CET-6.

Year	Test	P1	P2	P3	Mean		SD
2020.7	T1	15.26	15.12	16.31	15.56	14.89	0.65
	T2	14.14	13.61	16.54	14.76		1.56
	T3	15.19	11.41	16.43	14.34		2.61
2020.12	T1	16.24	11.86	13.20	13.77	13.81	2.24
	T2	13.24	15.85	14.31	14.47		1.31
	T3	13.45	13.15	12.95	13.18		0.25
2021.6	T1	15.25	14.18	13.11	14.18	13.16	1.07
	T2	12.54	12.26	12.89	12.56		0.32
	T3	12.35	14.15	11.69	12.73		1.27
2021.12	T1	13.24	13.38	13.57	13.40	13.41	0.17
	T2	14.39	14.25	13.79	14.14		0.31
	T3	10.60	12.83	14.63	12.69		2.02
2022.6	T1	13.29	14.64	13.38	13.77	14.41	0.75
	T2	15.67	13.40	15.11	14.73		1.18
	T3	15.67	13.40	15.11	14.73		1.18
	Mean	13.95	13.72	14.04	13.93	13.93	0.17
	SD	1.58	1.08	1.37	0.88	0.71	

Mean score of 45 passages = 13.93; SD of the scores of 45 passages = 1.40.

22-year-old American college juniors. The mean RI1 of each time varies from 13.16 to 14.89 without a big range. The standard deviation of the mean RI1 of each time is 0.71, indicating that the reading level of CET-6 stays relatively stable over the years. However, the mean RI1 of each time is 13.93, very close to 14, indicating the reading comprehension part in CET-6 is fit for about 21-year-old American college freshmen or sophomores. Therefore, it is quite difficult for Chinese freshmen or sophomores to understand such difficult reading passages in CET-6.

4.2.3. A Comparison of Readability Index 1 between Textbooks and CET-6

Comparing Table 7 with Table 8, it can be seen that the mean RI1 of textbooks is 11.87 while that of CET-6 is 13.93. The score of 11.87 corresponds to the reading level of high school juniors or seniors while the score of 13.93 corresponds to the reading level of college freshmen or sophomores. An evaluation of the RI1 shows that the mean RI1 of CET-6 is much higher than that of passages in volumes 3 and 4 respectively, indicating that the reading passages in CET-6 are more difficult than passages in each volume as a whole.

There is no indication showing whether the differences between the reading level of different volumes and that of CET-6 is significant or not. The statistical device SPSS is used to compute the significance of the differences between the mean RI1 of each volume and that of CET-6. The results are presented in Table 9.

As presented in the table, the difference between the mean RI1 of volume 3 and that of CET-6 is statistically significant ($t = -4.455$, $p < 0.05$); the difference between the mean RI1 of volume 4 and that of CET-6 is not statistically significant ($t = -1.854$, $p > 0.05$). Because 3 texts in volume 4 are above the 13th grade, 4 of the other 5 passages are above the 10th grade, only 1 text is in a lower grade, making the mean of the RI1 of volume 4 quite close to that of CET-6. Table 10 provides a specific distribution of the reading levels of texts in textbooks and CET-6 from July 2020 to June 2022 and shows the relationship between their reading levels more clearly.

It demonstrates that the reading level of all the examinations are in the 13th and 14th grade, corresponding to American college freshmen and sophomores. Of the 16 texts from volume 3 and 4, only 4 texts, 1 in volume 3 and 3 in volume

Table 9. Significance of differences between the mean RI1 of textbooks of Each volume and that of CET-6.

Text Resource	Mean	SD	T	P
Volume 3	11.41	1.88	−4.455	0.000
CET-6	13.93	1.40		
Volume 4	12.34	2.36	−1.854	0.101
CET-6	13.93	1.40		

Table 10. Distribution of the reading levels of textbooks and CET-6.

Score	Grade-level	Textbook	CET-6
6	6th grade		
7	7th grade		
8	8th grade	T5-3, T6-3, T6-4,	
9	High school freshman		
10	High school sophomore	T1-3, T2-4,	
11	High school junior	T4-3, T1-4, T7-4	
12	High school senior	T2-3, T7-3, T8-3, T5-4,	
13	College freshman	T3-3, T4-4,	Dec. 2020, Jun. 2021, Dec. 2021,
14	College sophomore		Jul. 2020, Jun. 2022
15	College junior	T3-4, T8-4	
16	College senior		
17	College graduate		

*T1-3 refers to text 1 in volume 3, T1-4 refers to text 1 in volume 4.

4, are at the same or the above level of the examinations. The rest 12 texts are all below the 13th grade, 4 in the 12th grade, 3 in the 11th grade, 2 in the 10th grade and 3 in the 8th grade. Therefore, most of the texts in volume 3 are easier for the preparation for CET-6, some of the texts in volume 4 can be a criterion for the selection of reading materials for CET-6.

According to the requirement of College English Curriculum, most colleges set college English or intensive English as a compulsory course for the first two years. From the third year on, there are different kinds of optional courses from ESP. ESP refers to the courses set for specific purposes, such as Chinese culture, business English, speech and so on. The credit for ESP courses is much lower than that for college English, that is to say, there are fewer English classes every week. Thus it is best for students to pass CET-6 in their first two years. However, it is noted that most of the texts in textbooks are easier than those in CET-6. Therefore, it is advisable that teachers should supplement some reading materials which are at or above the difficulty level of the reading passages from CET-6 for students to read after class so as to improve their English reading ability.

5. Conclusions

5.1. Major Research Findings

This thesis aims to analyze the text readability of texts in New Target College English Integrated Course (2nd edition) volumes 3 and 4 used by sophomores and reading comprehension passages in college English test Band 6 from the perspectives of Flesch Reading Ease and Readability Index 1 and make a com-

parison of their readability. With the help of the statistics it can be judged whether the texts in the textbooks are consistent with reading comprehension passages in CET-6 or not in terms of text readability. According to the data collected and analyzed, several remarkable findings can be found as follows:

1) Both volume 3 and volume 4 of the textbooks are at a fairly difficult readability level with the mean RES of 55.85 and 51.02, the mean RI1 of 11.41 and 12.34. Volume 4 tends to be more difficult than volume 3 because the mean of RES is lower and the mean of RI1 is higher. Texts in volume 3 are fit for 17-year-old American high school juniors and those in volume 4 are fit for 18-year-old American high school seniors. The variation of the difficulty of texts is larger in volume 4 than that in volume 3 with a larger standard deviation of both RES and RI1.

2) CET-6 papers are at a difficult readability level with the mean RES of 41.73 and the mean RI1 of 13.93. The difficulty level stays quite stable during the last three years with a standard deviation of 2.94. Reading comprehension passages in CET-6 is fit for about 21-year-old American college freshmen or sophomores. The variation in the difficulty of comprehension passages in CET-6 is small with a low standard deviation in terms of both RES and RI1.

3) The reading passages in CET-6 papers are more difficult than those in textbooks overall in terms of the mean of RES. Both volume 3 and volume 4 are significantly easier than CET-6 papers. Only 6 texts in 2 volumes are of the same difficulty level as the papers, all the other texts are below the difficulty level.

4) Texts in volume 3 are significantly easier than passages in papers in terms of the mean of RI1. However, the readability level of volume 4 is not significantly different to that of CET-6 papers. 3 texts in volume 4 are above 13^{th} grade, 2 are even at a higher grade-level than the papers, only 1 text is at a lower grade-level.

In conclusion, both volume 3 and volume 4 are easier than CET-6 papers in terms of the mean of RES and RI1. However, volume 4 is more consistent with CET-6 papers in terms of RI1 and can be used as good reading materials for the preparation for CET-6.

5.2. Limitations

Great efforts have been made to collect, calculate and analyze the texts in textbooks and CET-6 papers to get a scientific assessment of text readability. The employment of different readability formulas and SPSS is to get objective and comprehensive results in terms of readability of textbooks and CET-6 papers. A comparison has been made between textbook readability and paper readability to make a contribution to textbook compilation and choice of proper reading materials. However, some limitations can not be avoided.

Firstly, results might be influenced by the limitation of the data. Only text A in the textbooks is selected. However, students also learn text B in class or autonomously. Thus the results of the study are not comprehensive enough. Meanwhile, all the titles, Chinese tips for words and notes are all excluded when as-

sessed on the WE Research platform. In fact, titles and tips sometimes can be of great use in better understanding a passage. Therefore, all these factors may influence the accuracy of the results.

Secondly, commonly used readability formulas only assume a unidimensional representation. A single dimension usually provides common currency for different texts and might ignore the factors that may influence comprehension of the text, for example, the reader's deeper levels of understanding. Therefore, it is not informative enough for educators in diagnosing a specific characteristic of a text that may be challenging or useful for a reader.

Conflicts of Interest

The author declares no conflicts of interest.

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