

## The Readability Analysis of English Reading Passages in the Teaching Document by Using Coh-Metrix

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#### บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อวิเคราะห์ระดับความยากง่ายของการอ่านและวิเคราะห์ลักษณะด้านภาษาของบทอ่านภาษาอังกฤษในเอกสารประกอบการสอนโดยใช้โคห์เมตริกซ์ ซึ่งลักษณะด้านภาษานี้ประกอบไปด้วย 5 องค์ประกอบ คือ คุณลักษณะการเล่าเรื่องความเรียบง่ายเชิงโครงสร้าง, ความเป็นรูปธรรมของคำ, ความเชื่อมโยงแบบอ้างอิงและความเชื่อมโยงเชิงลึก เครื่องมือที่ใช้ในงานวิจัย คือ บทอ่านภาษาอังกฤษจำนวน 20 บทอ่านในเอกสารประกอบการสอน ซึ่งผู้วิจัยเป็นผู้รวบรวม เรียบเรียง และปรับใช้ และ โปรแกรมโคห์เมตริกซ์ สถิติที่ใช้ในการวิจัย คือ ร้อยละ ค่าเฉลี่ย และส่วนเบี่ยงเบนมาตรฐาน ผลการวิจัยค้นพบว่าความยากง่ายของบทอ่านภาษาอังกฤษในเอกสารประกอบการสอนอยู่ในระดับปานกลางสำหรับผู้อ่านความยากง่ายของบทอ่านนี้อยู่ระหว่างระดับมัธยมปลายถึงระดับปริญญาตรีตอนต้น สำหรับลักษณะด้านภาษาของบทอ่านนั้นมีความเป็นรูปธรรมของคำอยู่ในระดับสูง ในขณะที่คุณลักษณะการเล่าเรื่อง ความเรียบง่ายเชิงโครงสร้าง ความเชื่อมโยงแบบอ้างอิงและความเชื่อมโยงเชิงลึก อยู่ในระดับปานกลาง ผลการวิจัยยังระบุด้วยว่าบทอ่านสำหรับการฝึกทักษะการอ่านจำเป็นต้องเลือกอย่างเหมาะสม เพราะบทอ่านที่เหมาะสมกับผู้อ่านจะทำให้ผู้อ่านได้รับประโยชน์มากกว่าจากการฝึกอ่านโดยใช้บทอ่านเหล่านี้

**คำสำคัญ:** การวิเคราะห์ความยากง่ายของการอ่าน, บทอ่านภาษาอังกฤษ, เอกสารประกอบการสอน, โคห์เมตริกซ์

## Abstract

This research aims to analyze the readability level and the linguistic characteristics of English reading passages in the teaching document by using Coh– Metrix containing five aspects of linguistic characteristics: narrativity, syntactic simplicity, word concreteness, referential cohesion, and deep cohesion. The instruments of the study are twenty English reading passages, which were compiled and adapted by the researcher, and Coh– Metrix program. The statistics used for data analysis are percentage (%), mean ( $\bar{X}$ ), and standard deviation (SD). The findings from the study indicated that the readability of English reading passages in the teaching document is at a moderate level for readers. This readability of the reading passages is during high school level and college freshmen level. For the linguistic characteristics, word concreteness in the reading passages is high. As narrativity, syntactic simplicity, referential cohesion, and deep cohesion, they are at a moderate level. It is also recommended that the passages for reading practice need to be suitably selected. The suitable reading passages will ensure that the readers obtain more benefit from the passages they read.

**Keywords:** readability analysis, English reading passages, teaching document, Coh- Metrix

## 1. Introduction

In learning any language, reading is considered as an essential basic skill because this is a way to develop a target language. Undoubtedly, this skill affects learners' language competence. For learning English as a foreign language, reading skill also plays a significant role because it is a path to learn a second language (Anderson, 1999). When reading skill is adequately developed, learners can use it to enhance the language. Certainly, a learning media, that is used for training and practicing English reading skill, is an English textbook or teaching document. This is a basic learning media for teachers to conduct learning activities regarding English reading in which reading passages are normally used for training and practicing English reading skills. However, suitable reading passages for each group of learners are dramatically necessary to be considered. The reading passages, which are too easy or too difficult, are not good learning media for reading development. It is believed that too easy passages are not challenge for upper learners, and too difficult passages are not motivated for lower learners (Guo and Lu, 2014). Therefore, text readability is an important index to measure the level of text difficulty.

For readability analysis, it is a measure for predicting the ease or difficulty of reading comprehension (Pikulski, 2002). Structural and lexical features are estimated for the result (Nuttall, 2005). This can be mentioned that the main purpose of readability is normally focused on making sure that each reading passage is suitable for the level of learners' proficiency. The reason is that suitable reading passages for learners' proficiency will support the language learning (Adam, 2009). In part of readability analysis, it can be operated through various approaches. However, there are only some approaches that are effective and widely used. Definitely, the use of Coh- Metrix is a way to analyze readability.

Although, there have been some studies regarding readability analysis, many of them are readability analysis in parts of the passages from English textbooks and English tests. From this issue, this study was conducted to make up for the gap. Thus, this research aims to analyze the readability level and the linguistic characteristics of English reading passages in the teaching document, that the researcher compiled and adapted these passages, by using Coh- Metrix. The conceptual framework of this readability analysis contains five components: narrativity, syntactic simplicity, word concreteness, referential cohesion, and deep cohesion. It is believed that the finding from the research will be useful for developing English reading skill by using the suitable reading passages.

## **2. Purposes of Research**

2.1 To analyze the readability levels of English reading passages in the teaching document by using Coh-Metrix

2.2 To analyze the linguistic characteristics of English reading passages in the teaching document by using Coh-Metrix

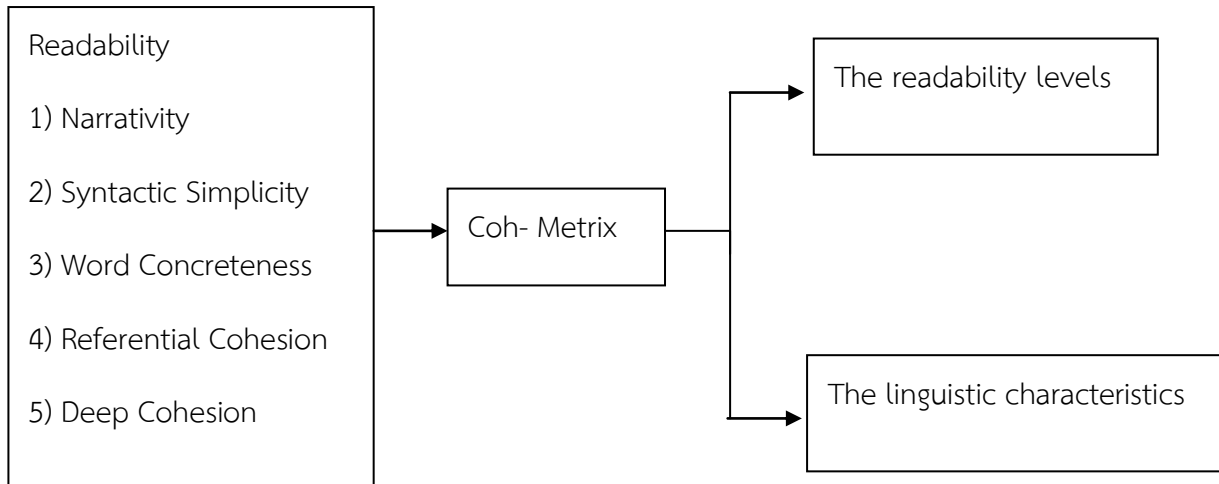
## **3. Research Questions**

3.1 What are the readability levels of English reading passages in the teaching document by using Coh- Metrix?

3.2 What are the linguistic characteristics of English reading passages in the teaching document by using Coh- Metrix?

#### 4. Conceptual Framework

This conceptual framework can be illustrated as follows:



##### 5.1.1 Definition of Readability

There are various definitions of readability defined by many scholars. However, it can briefly be explained that readability has been defined as a measure for predicting text difficulty by applying different types of readability formulas. Besides, it can also be defined as an indicator to measure the ease on text comprehension (Pikulski, 2002). The level of ease or difficulty is measured via the analysis of the features of a text. These features derive from both lexical and structural aspects (Nuttall, 2005).

##### 5.1.2 Formulas of Readability

Normally, readability is measured through readability formulas. There are many formulas, which are used to measure readability, but Flesch Reading Ease and Flesch–Kincaid Grade Level are popular used in predicting difficulty level (Solnyshkina, Harkova, and Kiselnikov, 2014). These formulas measure the difficulty level based on the lengths of words and sentences in a reading text. The concept is that longer words or sentences tend to be more difficult to understand (Graesser, McNamara, and Louwerse, 2003).

Besides, Coh – Metrix Text Ease and Readability Assessor has been developed as a readability formula for analyzing reading text that is printed in English as a second language. This formula can be used to analyze more objective and valid consequences. Besides, it can also be applied to describe deeper levels of discourse by the algorithm. This type of formula provides a picture of text ease or difficulty which is based on linguistic characteristics. These linguistic characteristics consist of narrativity, syntactic simplicity, word concreteness, referential cohesion, and deep cohesion (McNamara, Graesser, and Louwerse, 2012).

According to the information of linguistic characteristics, narrativity refers to telling a story by characters, places, and events. It is related to word familiarity, everyday language, and world knowledge. This is easier to understand than informational reading text (Graesser, Olde, and Klettke, 2002). The next linguistic characteristic is syntactic simplicity. It is the number of words per sentence, and simplicity and familiarity of each sentence. The sentence, which consists of longer words and complicated structures, is more challenging to comprehend (McNamara, Graesser, McCarthy, and Cai, 2014). For word concreteness, this is the concreteness degree of each word. The reading text, which contains higher numbers of concrete and meaningful words, tends to be easier to understand (McNamara and Graesser, 2012). As Referential cohesion, it shows the linkage or connection of words and ideas in a sentence. A reading text is more cohesive if words and ideas in that a high number of connection (McNamara, Graesser, McCarthy, and Cai, 2014). The final linguistic characteristic is deep cohesion. This aspect is the level of international and causal connectives. A reading text, that has a higher number of explicit connectives, is easier to be understood (Graesser, Olde, and Klettke, 2002).

## ***5.2 Related Studies***

For surveying related research, it found that there are some studies about readability analysis which are shown as following information.

Firstly, the study of Rojanarowan, Yutdhana, and Rungruang (2017), this research investigated about the readability of secondary and high school level commercial textbooks. It found that the readability of secondary school level commercial books in part of word concreteness is at a high level. For narrativity, syntactic simplicity, and deep cohesion, they are at a moderate level. As referential cohesion is at a low level. Meanwhile, the readability of high school level commercial books in part of deep cohesion is at a high level. For narrativity, syntactic simplicity, and word concreteness are at a moderate level. As referential cohesion, it is at a low level.

Secondly, the research of Johnson (1977), this study conducted about the readability levels of fifty – six elementary social study textbooks published between 1972 and 1976 through readability formulas. It found that those textbooks were not easy to comprehend for elementary school students. The trend of reading difficulty of the textbooks was lower.

Lastly, the study of Owu– Ewie (2004), this research investigated about the readability level of comprehension passages in English textbooks in junior high schools in Ghana. It found that most of the reading passages were above the reading level of the students. According to the appeared results, some suggestions were given to improve reading passages in the textbooks for more suitability.

## 6. Research Methodology

The teaching document was created and completed in 2022 by the researcher in which the contents were compiled and adapted from some textbooks and websites. This teaching document is used for learning and teaching management in English for a communication course. This is a compulsory course at Nakhon Phanom University which is organized for undergraduate students. Reading practice is a part of the course. It consists of twenty reading passages.

The reading passages were computationally analyzed through Flesch Reading Ease and Flesch–Kincaid Reading Grade Level which were two readability formulas of Coh–Metrix. Firstly, they were used to calculate for finding out the average percentages. These average percentages were used to analyze the readability levels. Next, five linguistic characteristics, which were used to be estimated in parts of the readability levels, were analyzed. These linguistic characteristics contained narrativity, syntactic simplicity, word concreteness, referential cohesion, and deep cohesion. The consequences were averaged as the mean values to find out the aspects of linguistic characteristics which were used in each reading passage of the teaching document.

In part of Flesch Reading Ease, its calculation formulas can be explained as following information.

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

ASW = average number of syllables per word

ASL = average sentence length

The score of the formula ranges can be divided into seven degrees which are shown in table 1.

**Table 1** The degrees of Flesch Reading Ease

Scores	Descriptions
90 - 100	It is very easy to read.
80 - 90	It is easy to read.
70 - 80	It is fairly easy to read.
60 - 70	It is standard level.
50 - 60	It is fairly difficult to read.
30 - 50	It is difficult to read
0 - 30	It is very difficult to read.

For Flesch–Kincaid Reading Grade Level, its calculation formulas can be explained as following information.

Flesch– Kincaid Reading Grade =  $0.39ASL + 11.8ASW - 15.59$

ASW = average number of syllables per word

ASL = average sentence length

The score of the formula ranges can be divided into twelve degrees which are shown in table 2.

**Table 2**The degrees of Flesch– Kincaid Reading Grade Level

Scores	Estimated Reading Grade Levels
17	College graduate
16	College senior
15	College junior
14	College sophomore
13	College freshman
12	High school senior
11	High school junior
10	High school sophomore
9	High school freshman
8	8 <sup>th</sup> grade
7	7 <sup>th</sup> grade
6	6 <sup>th</sup> grade

As the analysis by Coh – Metrix, the score levels can be categorized into three levels which are explained in table 3.

**Table 3** The score levels of analysis by Coh– Metrix

Score Levels	Descriptions
Lower than 25	Low
Since 25 - 75	Moderate
Higher than 75	High

## 7. Results

### 7.1 *The Readability levels of reading passages in the teaching document*

For answering the first research question: “What are the readability levels of English reading passages in the teaching document?”, two readability formulas of Coh– Metrix were used as tools for analysis. In part of interpreting the values of Flesch– Kincaid Grade Level formula, a higher value means the reading passage is more difficult which is used in a higher grade level, and a lower value means the reading passage is less difficult which is probably used in a lower grade level. As Flesch Reading Ease, a higher value means the reading passage is less difficult, and a lower value means the reading passage is more difficult. The following table shows readability levels of reading passages in the teaching document.

**Table 4** The average readability levels of reading passages in the teaching document

Index	Readability Levels of Reading Passages in the Teaching Document (20 reading passages)	
	Mean	SD
Flesch Reading Ease	50.68	10.32
Flesch– Kincaid Grade Level	12.35	2.66

From the information of table 1, it shows the average readability levels of reading passages in the teaching document. The consequences indicate that the readability level of reading passages in the teaching document is moderate for readers. This readability level of the reading passages is during high school senior level and college freshman level.

According to the above results, the average readability level of reading passages in the teaching document calculated through Flesch Reading Ease is 50.68 (SD = 10.32). This means that the readability of those reading passages is at a moderate level. As the average readability level of reading passages in the teaching document calculated through Flesch– Kincaid Grade Level, it is 12.35 (SD = 2.66). This means that the level of those reading passages is suitable for high school seniors and college freshmen levels.

### 7.2 *The linguistic characteristics of reading passages in the teaching document*

For answering the second research question: “What are the linguistic characteristics of English reading passages in the teaching document?”, Coh– Metrix was used as the tool for

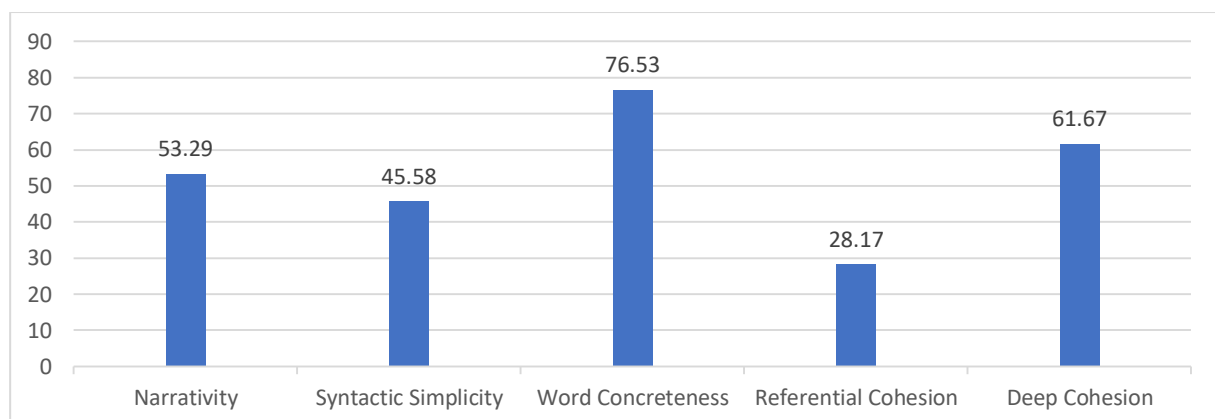


analysis. The consequences were analyzed to find out the linguistic characteristics of reading passages in the teaching document. The following table shows the consequences.

**Table 5** The linguistic characteristics of reading passages in the teaching document

Linguistic Characteristics	Reading Passages in the Teaching Document (20 reading passages)	
	Mean	SD
Narrativity	53.29	25.15
Syntactic Simplicity	45.58	22.75
Word Concreteness	76.53	34.42
Referential Cohesion	28.17	26.48
Deep Cohesion	61.67	26.12

**Figure 1** The linguistic characteristics of reading passages in the teaching document



From the information of table 2 and figure 1, they display the linguistic characteristics of the reading passages which contain five aspects: narrativity, syntactic simplicity, word concreteness, referential cohesion, and deep cohesion.

According to the above information in table 2 and graph, it found that the average level of word concreteness is 76.53 (SD = 34.42). This result can be interpreted that the average levels of the use of word concreteness in the reading passages is at a high level. For the other aspects, the information shows that the average levels of the uses of deep cohesion is 61.67 (SD = 26.12), narrativity is 53.29 (SD = 25.15), syntactic simplicity is 45.58 (SD = 22.75), and referential cohesion is 28.17 (SD = 26.48). These consequences can be interpreted that the uses of deep cohesion, narrativity, syntactic simplicity, and referential cohesion are at a moderate level.

## 8. Conclusion

Reading is considered as a significant skill in English language. Also, the use of a suitable learning material is very essential for reading learning and practice. Obviously, a text is variously used to develop reading skills. Thus, it should be suitable for the grade level of each reader. This research aimed to analyze the readability levels and the linguistic characteristics of English reading passages in the teaching document by using Coh– Metrix. The consequences of the study can be concluded that the readability of the passages in the teaching document is at a moderate level for readers. This readability of the reading passages is during high school senior level and college freshman level. For the linguistic characteristics of the passages, the results specified that the average level of the use of word concreteness is at a high level. As the other aspects, the average levels of the uses of deep cohesion, narrativity, syntactic simplicity, and referential cohesion are at moderate level.

## 9. Discussion

This research aimed to study the readability levels and the linguistic characteristics of English reading passages in the teaching document by using Coh– Metrix. From the consequences of the study, they can be discussed according to the research questions as the following information.

For the first research question, they indicate that the average readability level of reading passages in the teaching document is moderate. This average readability level can be considered during high school senior level and college freshman level. It means that the average level of those reading passages is suitable for high school senior level and freshman level. From these results, the average readability level of reading passages in the teaching document seems to be quite suitable for the first – year undergraduate students in which the researcher is willing to use this teaching document with them. This point is quite very significant for the effectiveness of reading practice. For most effective reading practice, ease or difficulty level should be suitable for the grade level of each student. This issue is congruent with the research of Guo and Lu (2014), it specifies that if a text is too easy, the students might feel that it is not challenge. On the contrary, if a text is too difficult, these students need to often use a dictionary to find out the meanings of what is read which might be discouraged. Similarly, the study of Gu and Guan (2003), it also indicates that a textbook should not be too easy or too difficult for the grade level of the students. This suitability enables the students to practice and train reading skills more effectively. Moreover, the research of Srisunakrua and Chumworatayee (2019), it shows that a suitable ease or

difficulty level of the learning material is very important. The main reason is that it will make sure that the students obtain the most usefulness from the learning material.

As the results of the second research question, these explain the linguistic characteristics of the reading passages in the teaching document which contain five aspects: narrativity, syntactic simplicity, word concreteness, referential cohesion, and deep cohesion. According to the consequences, the linguistic characteristic of the reading passages in the teaching document in part of word concreteness is at a high level. It means that the reading passages in the teaching document seem to be highly meaningful and easy to understand. This result is related to the study of McNamara and Graesser (2012), this specifies that a text, which consists of many concrete words, has tendency to be easier to comprehend the meaning of what is read. Besides, the research of Silfhout (2014), it indicates that high word concreteness is more interesting, and this enables the readers to comprehend a text more easily than a text containing many abstract words. As the linguistic characteristics of narrativity, syntactic simplicity, referential cohesion, and deep cohesion are at a moderate level. These things can be explained that the reading passages of the teaching document are at a moderate level in parts of telling a story by using simple words or everyday language, using the number of words per sentence and simplicity of each sentence, linking words and ideas in a sentence, and containing the number of explicit connections.

## **10. Recommendations**

### ***10.1 Contribution of the research***

According to the review from related studies, it found that they were conducted for analyzing readability in parts of the passages from English textbooks and English tests. Hence, this research was conducted to fulfill the gap. The researcher created teaching document by compiling and adapting reading passages from other related textbooks and websites. Then, these compiled and adapted passages were analyzed in parts of the readability levels and the linguistic characteristics.

The results found that the readability of the reading passages in the teaching document is at a moderate level. This level of the readability is during high school level and college freshmen level. These findings contribute to ensure that the selected reading passages are suitable for the levels of readers. The reading passages, which are too difficult, might not be able to motivate the readers. Simultaneously, the readers might not be challenged if the reading passages are too easy. Thus, the suitable reading passages enable the readers to obtain more benefits from reading.

Moreover, this research can be applied as a guideline for other teachers. They can be guided to analyze the readability level of English reading passages from the selected

textbooks or another resource through Coh– Metrix. Also, they can perceive and understand about the principles of readability analysis, and the significance of using reading passages that are suitable for the level of readers.

## 10.2 Future research

The study focused on the analysis of the readability levels of English reading passages in the teaching document. These reading passages were analyzed to present the readability levels and the linguistic characteristics. However, when the difficulty level of the reading passages is estimated, other considerations should also be analyzed such as the readers, the reading activities, and the reading task setc. The interaction between the readers and the target reading passages, which is related to reading proficiency, reading purpose, and reading motivation, can be a factor affecting reading comprehension. It is beyond the scope of this study. Hence, interpretation and generalization of the consequences of the research should be carefully undertaken since the readability levels of the reading passages were estimated by analyzing only the reading passages in the teaching document.

Moreover, the number of reading passages should be increased for analysis. English reading passages in the teaching document or textbook used in learning and teaching and English reading passages in a Standard English textbook can be analyzed and compared. This comparison can be used to reflect in part of the quality of English reading passages used in learning and teaching.

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