

Correlation of English Scientific Vocabulary Mastery with English for Specific Purposes Text Comprehension on Health Science School Students

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ABSTRACT

The objective of this study was to investigate the correlation between English scientific vocabulary mastery and comprehension of English for Specific Purposes (ESP) texts, particularly Microbiology and Physiotherapy texts. Data was obtained from 2 study programs: 16 Physiotherapy students and 26 Pharmacy students. Data was acquired by giving vocabulary and reading to students who had previously been taught English scientific vocabulary and ESP reading texts. Vocabulary and reading materials taught and tested in the two Study Programs were different, based on the needs of Study Programs. Data analysis was carried out using *t test* to determine the correlation between mastery of English scientific vocabulary and comprehension of ESP texts. Based on the analysis on Pharmacy students, there is a significant correlation between vocabulary scores and reading scores (P value <0.05). Meanwhile, in the correlation analysis of English scientific vocabulary mastery and physiotherapy text comprehension, a value of 002 <0.05 was obtained, which means that there is a significant correlation of vocabulary scores and reading scores. Based on the results obtained, it can be concluded that there is a significant correlation between the English scientific vocabulary mastery and the comprehension of English for Specific Purposes Text.

Keywords: Correlation; English Scientific Vocabulary; English for Specific Purposes Text

A. Introduction

Fishman and Conrad (cited by Lily, 2019) stated that English is the more dominant language compared to other languages in the world. About two thirds of people in the world use English in daily life to communicate. Regarding this phenomenon, currently more and more people are learning to use English as a second language.

To be able to use a language effectively, one aspect that must be mastered is vocabulary. Vocabulary is a reflection of our knowledge and experiences from our social interactions (Blachowicz & Ogle, 2008). Vocabulary is a substantial aspect of understanding a language because learners cannot express feelings without sufficient

and appropriate knowledge (Tovar Viera et al., 2017). Vocabulary knowledge is an essential tool for those learning English as a second language because a limited vocabulary will hinder effective communication (Alqahtani, 2015; Harji et al., 2015). It is necessary to master vocabulary well in order to master listening, speaking, reading, as well as writing, (Lily, 2019).

In addition, reading skill is as important as vocabulary knowledge in using and comprehending language. By reading, someone receives a lot of information. The more he reads, the more information he receives. Reading can make a person smarter and more creative (Furqon, 2013). Comprehending what is read is an important aspect of good literacy that influences successful education and economy (Silva & Cain, 2015).

As two important aspects on language use, Nation (cited by Alqahtani, 2015) stated the relationship between the two: vocabulary knowledge enables someone to use language and vice versa, language use will lead to vocabulary use. Vocabulary and reading comprehension promote the improvement of each other (Xie & Yeung, 2022). This opinion was also supported by Coady and Huckin (cited by Harji et al., 2015) claiming that one must read to be lexical yet also must learn vocabulary to be able to read. Babayigit and Shapiro found that vocabulary has a central role in comprehending reading texts (Babayigit & Shapiro, 2020).

The correlation between vocabulary and reading comprehension has been investigated in different parts of the world, where English becomes a second language, using a variety of methods and subjects. Sidek studied the role of vocabulary on students' reading text comprehension in a public school in Malaysia. This study asserted that students' comprehension of reading texts was determined by students' level of vocabulary knowledge (Sidek & Rahim, 2015). Harji & Balakrishnan investigated the vocabulary levels and size of graduates in a private university in Malaysia. The findings recorded that vocabulary is an essential prerequisite for language comprehension and vocabulary competence enables effective reading and language comprehension. Students with limited vocabulary size will have difficulty in comprehending the contents of the text they read (Harji et al., 2015).

Masrai surveyed 256 Arabic students learning English to see how vocabulary knowledge at varying frequencies was related to comprehend texts. This study shows

that high-mid frequency vocabulary contributes to text comprehension (Masrai, 2019). Brooks studied 31 participants at an international school in Japan to examine factors that may affect their text comprehension skill. There are four factors affecting the ability to understand texts: knowledge in vocabulary, ability to decode word, ability in linguistic, and fluency in reading. The research argued that various vocabulary knowledge indicated a variety of reading comprehension scores compared to other factors. Second language learners need to increase their vocabulary to improve text comprehension (Brooks et al., 2021). In Indonesia, Furqon proved that vocabulary mastery and reading comprehension correlates significantly. Vocabulary mastery contributes to students' comprehension of the text (Furqon, 2013).

Some existing research limitedly targeted the relation between the size or level of vocabulary and text comprehension. However, Lily found a correlation between vocabulary mastery and the ability to comprehend English for Specific Purposes (ESP) texts among students at the nursing academy in Medan (Lily, 2019).

English for Specific Purposes is defined as teaching and learning English as a second language targeting on mastering English in a specific field (Brian & Starfield, 2013). Globalization and the wider use of English have brought English for Specific Purposes into a substantial curriculum in various high schools in East Asia (Choi, 2021).

Several things that differentiate English for Specific Purposes and General English are the skills taught, the topics raised, to the use of special vocabulary that is closely related to the field studied. The English language learning required by Pharmacy Diploma students is in Speaking and Translation skills, as well as in vocabulary mastery related to the health and Pharmacy fields (Semartini, 2022). In contrast, the English language learning required by Engineering students is in the Reading skill (Gözüyeşil, 2014). In other words, students need to be taught vocabulary and text based on their field.

It is necessary to examine how English scientific vocabulary correlates with comprehending of English for Specific Purposes text. Regardless of the level or size of the mastered vocabulary, this study tries to see how the correlation between mastery of English scientific vocabulary and comprehending of English for Specific Purposes texts.

B. Research Method

The subjects of this study were 26 first-year students of the Pharmacy Diploma Study Program and 16 first-year students of the Physiotherapy Diploma Study Program in one of Health Science School in Surakarta. The sample used for this research was taken from one class for each study program. The object of this study was the correlation between the English Scientific Vocabulary mastery and the English for Specific Purposes Text comprehension. In this study, the text and vocabulary used were on Microbiology for Pharmacy students and on Physiotherapy for Physiotherapy students. The text selected were based on the course taught in the first semester for each study program. The research carried out was a quantitative study using a quasi-experimental method with a one-group-time-series research design. The research design used only one experimental group without a control group. The research procedure carried out is as following.

Preparation

The material prepared was such as scientific vocabularies related to microbiology and physiotherapy, as well as English for Specific Purposes text related to microbiology and physiotherapy. The material was composed by involving physiotherapy and microbiology lecturers as well as English lecturers.

Treatment

Pharmacy students were lectured vocabulary related to microbiology while physiotherapy students were lectured vocabulary related to physiotherapy. Learning related to vocabulary was carried out in 3 meetings.

Collecting Data

Data was collected by assigning a vocabulary test to see the score of students' scientific vocabulary mastery. After that, students were assigned a reading test to see the score of students' comprehending of reading texts. Pharmacy students were given texts related to microbiology while physiotherapy students were given texts related to physiotherapy.

The questions in the reading test were divided into 3 categories, namely easy, moderate, and difficult questions. Questions that belonged into the easy category were questions whose answers can be found easily in the text.

While questions that belonged into the moderate category were questions which, in order to find the answer, students must have a little understanding of the contents of the reading text, in which students also have sufficient vocabulary.

Finally, questions that belonged into the difficult category were questions which, in order to find the answer, students must have strategies in reading, comprehend the text, and have sufficient vocabulary.

Vocabulary mastery and reading comprehension scores were classified as follows.

Table 1. Classification and Score Range

CLASSIFICATION	SCORE RANGE
Excellent	80-100
Good	70-79
Average	60-69
Poor	<60

Data analysis

Vocabulary scores and reading scores that had been obtained were then analysed using SPSS to determine the correlation between scientific vocabulary mastery and reading comprehension.

C. Research Finding and Discussion

After conducting research and data analysis, the results are classified into four categories: Excellent, Good, Average, and Poor. The classification is based on the range of scores achieved by the respondents when taking the tests. This category applies to both Physiotherapy and Pharmacy students. The classification is illustrated in the table 1.

The finding section is divided into 3, namely the discussion on data analysis from pharmacy students, the second on physiotherapy students, and the last on the correlation between English scientific vocabulary and English for Special Purposes Text. The findings on Pharmacy Students and Physiotherapy students are explained separately because the English scientific vocabulary and reading texts given were different according to their background of knowledge. Therefore, the two cannot be equated.

1. Mastery of English Scientific Vocabulary on Pharmacy Students

Based on the results of data analysis, on the mastery of English scientific vocabulary, it was found that Pharmacy students had a very good mastery of scientific vocabulary. It can be noticed from the high percentage of students who were in the Excellent and Good categories. More than half of the students had good skills in mastering English scientific vocabulary.

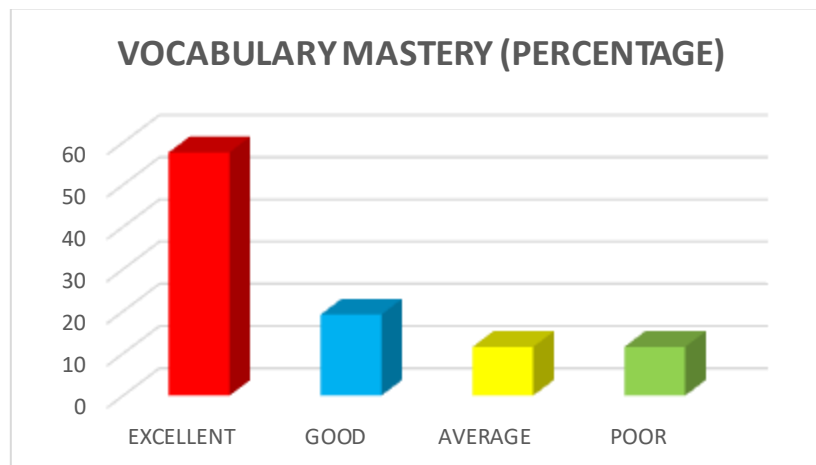


Chart 1. English Scientific Vocabulary Mastery on Pharmacy Students

2. Microbiology Text Comprehension on Pharmacy Students

Chart 2 illustrates that nearly half of Pharmacy students had poor understanding of microbiology texts, namely at 42.4%. However, students who have excellent score in comprehending microbiology texts were also high at 34.69%.

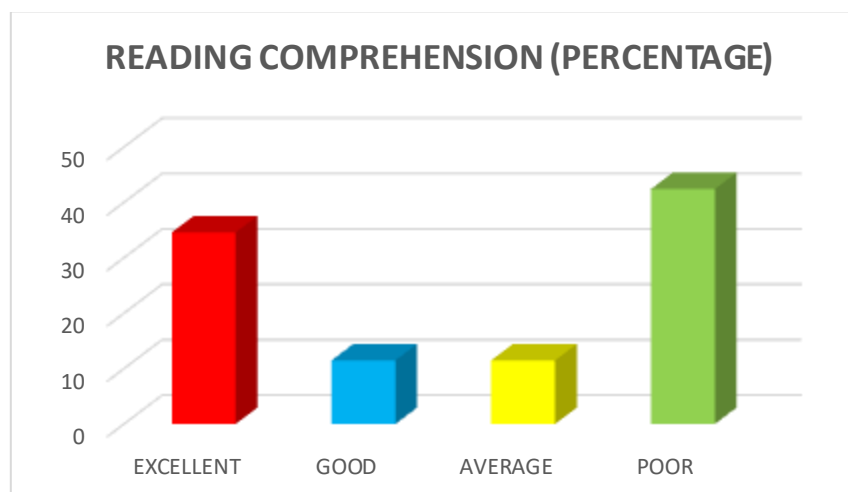


Chart 2. Microbiology Text Comprehension on Pharmacy Students

Furthermore, the ability to comprehend microbiology texts was classified based on the difficulty level of the questions, namely Easy Questions, Moderate Questions, and Difficult Questions. Easy Questions means that the answers to the questions are clearly stated in the text and students can find answers to the questions easily. Meanwhile, Moderate Questions have answers which are stated in the text, but students must have sufficient vocabulary and understanding to find answers to these questions. While Difficult Questions are questions that, in order to be able to answer them, students must have a strategy in reading, a good comprehension of the text, and sufficient vocabulary.

Chart 3 indicated that most of students were able to answer the Easy Question, that was 46.14% (Excellent). However, students who could not answer the easy questions were also high, namely 38.46% (Poor).

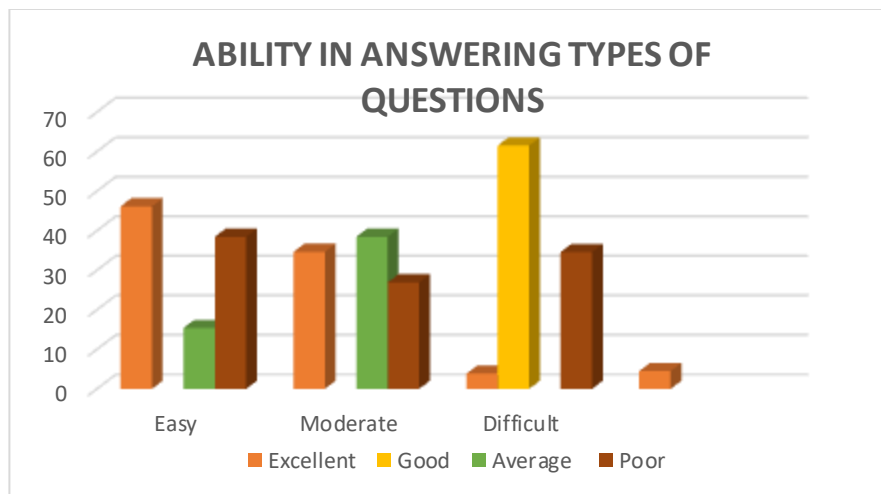


Chart 3. Classification of Ability in answering types of questions

Chart 3 also described the ability to answer the moderate questions was more evenly distributed. It can be perceived from the percentage of students' ability to answer questions which was quite similar.

There were only few students included in Excellent category for the difficult questions, namely 3.85%. It means that only a few students can answer the difficult questions very well considering that to be able to answer those questions, students must comprehend the text and have sufficient vocabulary. However, in contrast to the previous question categories, there were several

students who were in Good category or can answer the difficult questions well. As many as 61.54% of students achieved good score, while in the category of Poor, there was 34.61% of students. In other words, it is nearly half of the students had a poor comprehension so they could not answer the difficult questions

3. Correlation of English Scientific Vocabulary Mastery and Microbiology Text Comprehension.

The research aims to determine the correlation between mastery of English scientific vocabulary and English for Specific Purposes text comprehension. Therefore, it is necessary to do a correlation analysis to see how the relationship of both. After conducting the analysis, the results obtained were a P value <0.05 which means that there is a correlation between vocabulary scores and reading scores. Furthermore, in the significant analysis of the correlation, the significance value was 0.000, p-value <0.05.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-11.248	16.144		-.697	.493
Nilai Vocabulary	.921	.204	.677	4.512	.000

a. Dependent Variable: Nilai *Reading*

Table 2. Correlation result analysis

In other words, there is a significant relationship between mastery of English scientific vocabulary and comprehension of ESP texts. The higher the vocabulary score, the higher the reading text score. The more someone masters scientific vocabulary, the more he/she comprehends texts of English for Specific Purposes.

Correlations

		Nilai <i>Reading</i>	Nilai Vocabulary
Nilai <i>Reading</i>	Pearson Correlation	1	.677
	Sig. (2-tailed)		.000
	N	26	26
Nilai Vocabulary	Pearson Correlation	.677	1

Sig. (2-tailed)	.000	
N	26	26

** . Correlation is significant at the 0.01 level (2-tailed).

Significant analysis result

4. English Scientific Vocabulary Mastery of Physiotherapy Students

Based on the results of data analysis of scientific vocabulary mastery, it was found that Physiotherapy students had a very good score. The number of students who achieved excellent score was very high (56.25%). More than half of the participants had the ability to understand or master scientific vocabulary.

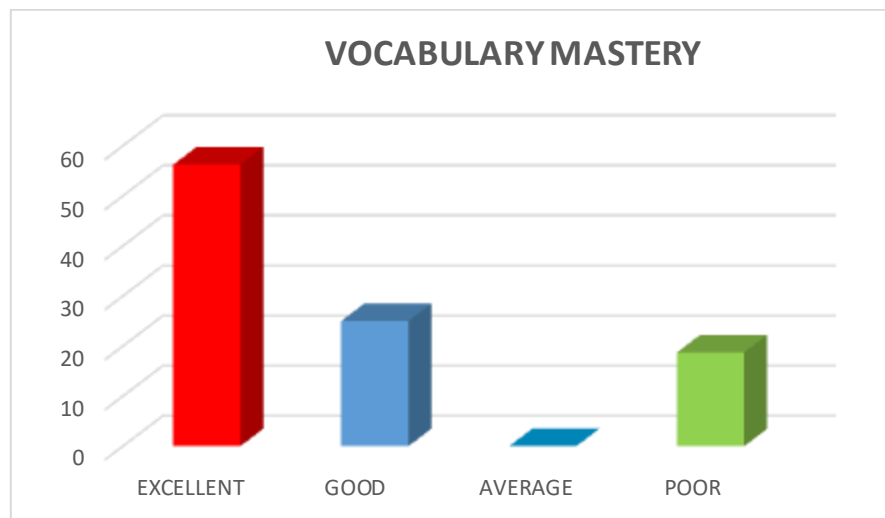


Chart 4. English Scientific Vocabulary Mastery on Physiotherapy Students

5. Physiotherapy Text Comprehension of Physiotherapy Students

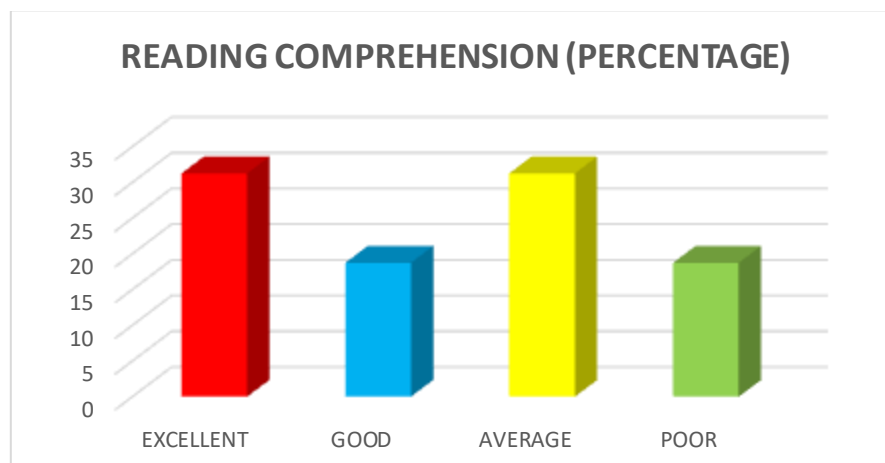


Chart 5. Physiotherapy Text Comprehension on Physiotherapy Students

Chart 5 illustrates that students who had the ability to comprehend physiotherapy texts are quite high. Chart 5 presents high percentage of students who achieved excellent score (31,25%) Meanwhile, students who had less ability to comprehend physiotherapy texts were also not very significant, namely at 18.75%. Furthermore, similar to questions in ESP texts for Pharmacy students, questions in Physiotherapy texts can be classified based on the difficulty level of the questions, namely Easy Questions, Moderate Questions, and Difficult Questions.

Chart 6 describes students' ability to answer the Easy Questions very well. Most students can answer the Easy Questions, which was at 68.75%.

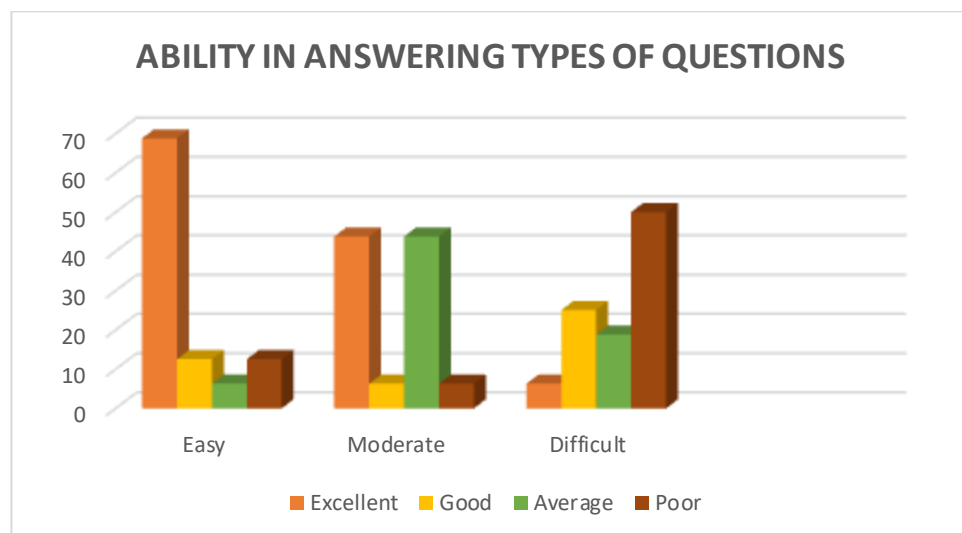


Chart. 6 Classification of Ability in answering types of questions

In regard to the moderate questions, the results obtained was 43.75% of students could answer questions very well or be included in Excellent category. 6.25% of students belonged into Good category which means that they could answer the moderate questions well and had a strategy for answering the questions. Meanwhile, 43.75% of students was included in Average category, which means that they had an average ability to answer the moderate questions. 6.25% of students had poor understanding so they cannot answer the moderate questions properly.

Chart 6 also illustrates that students who belonged to the Excellent category for the difficult questions were very few, namely 6.25%. It indicated that

only a few students could answer the difficult questions very well. Some students belonged to Good category or can answer the difficult questions well. As many as 25% of students was classified into Good category or students can answer questions well, although not as well as students in Excellent category. In Average category, there was 18.75% of students implying that they had an average understanding so they could answer the difficult questions quite well. Meanwhile, there was 50% of students belonged to Poor category. In other words, half of these students had a poor understanding so they could not answer the difficult questions.

6. Correlation of Vocabulary Mastery and Physiotherapy Texts Comprehension

To ascertain the correlation of English scientific vocabulary mastery and Physiotherapy Text comprehension, a test was conducted to determine the correlation. According to the correlation test, a significance value (Sig) of 0.002 was obtained, less than a probability of 0.05. Hence, it can be inferred that there is a correlation between vocabulary and reading scores.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	33.353	9.937		3.357	.005
Nilai Vocab	.455	.119	.715	3.828	.002

a. Dependent Variable: Nilai reading

Table 4. Correlation result analysis

In addition, to confirm the significance of the correlation between vocabulary and reading comprehension, a test was carried out to determine its significance. According to the test, the result obtained was a value of 002 <0.05. Thus, it can be inferred that there is a significant correlation between English scientific vocabulary mastery and Physiotherapy text comprehension.

Correlations

		Nilai Vocab	Nilai reading
Nilai Vocab	Pearson Correlation	1	.715***
	Sig. (2-tailed)		.002

	N	16	16
Nilai reading	Pearson Correlation	.715	1
	Sig. (2-tailed)	.002	
	N	16	16

** . Correlation is significant at the 0.01 level (2-tailed).

Words are tools for thinking, reading, and writing. Words determine a person's ability to think, understand, and communicate (Christoforo-Mitchell, 1998). Vocabulary is a collection of words that a person hears and reads throughout his life. One's vocabulary will not stop its development. The more a person's vocabulary, the greater his ability to understand what someone hears and reads (French, 2003). In other words, vocabulary is a basic skill needed in the ability to understand a text. Vocabulary is a way to get and access new knowledge. Through this vocabulary, knowledge can be conveyed to other people (Benjamin & Crow, 2013).

Grabe and Stoller (cited by Furqon, 2013) wrote that comprehension is processing words, forming a representation of a main idea, and integrating it into a new comprehension. Comprehension is obtained when one can take useful knowledge from a text and construct it into a new understanding or knowledge.

This study recorded that there is a strong relationship between English scientific vocabulary mastery and reading comprehension of English for Specific Purposes Text. Anderson and Freebody claimed that those who know more words are able to process various reading texts and are able to engage in discussions with people from various backgrounds (Sidek & Rahim, 2015). In this case, by mastering vocabulary, one can understand various discussions that require special knowledge, such as English texts for Specific Purposes.

However, vocabulary cannot be taken as the main factor in comprehending a text. Apart from vocabulary mastery, there are several factors that determine understanding of a text, such as reading strategies, even the emotions that accompany reading a text. Previous research shows that emotions, such as anxiety, can affect one's text comprehension (Zaccoletti et al., 2020). Kirmizi asserted that knowing the meaning of a word is not adequate to comprehend a reading text. A reader must be able to summarize, draw conclusions, or connect previous reading texts with the knowledge he has or with other reading texts (Kirmizi, 2010). In other words, a reader needs to apply

strategies in reading in order to comprehend a reading text well. Besides, a person's reading habits also have a relationship in understanding a reading text.

It is also presented in the results of this research. The vocabulary mastery of pharmacy students was quite high and shows the Excellent category. However, in reading text comprehension, various reading comprehension was found, even students who were included in the Poor category for reading text comprehension were also quite high. This does not mean that they do not have vocabulary mastery, but certainly there are several factors affecting their reading comprehension, and it requires further research to find out the background.

D. Conclusion

Regarding to the results of this research, there is a significant correlation between English scientific vocabulary mastery and reading comprehension, both on Physiotherapy students and Pharmacy students. However, when classified more deeply, it was found that most students could answer well on the easy questions and moderate questions of the English for Specific Purposes Text comprehension test. Whereas in Difficult Questions, most students experience difficulties.

Based on these results, it is necessary to increase vocabulary mastery in students in order to improve reading comprehension. Increasing vocabulary mastery among students will increase students' comprehension of various texts, especially in English for Specific Purposes texts.

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