The Correlation Between Students' Passive Vocabulary Mastery and Reading Comprehension

Calvina Izumi Febriani [1], Achmad Hilal Madjdi [2], Sri Surachmi W [3]

Universitas Muria Kudus, Indonesia
calvinaizumi999@gmail.com[1], achmad.hilal@umk.ac.id[2], sri.surachmi@umk.ac.id[3]

Abstract: Mastering vocabulary naturally aids students in the use of and examining the four language skills including, listening, speaking, reading, and writing. As a result, there is a precise hyperlink between vocabulary knowledge and language capability performance. Therefore, this study aimed to know the relationship between students' passive vocabulary mastery and reading comprehension at SMK PGRI 2 Kudus. The quantitative method design was used in this research. The research of this research was 30 students who were randomly selected. The instruments used were multiple-choice tests to measure passive vocabulary acquisition and reading comprehension. The data were analyzed using Pearson product-moment correlation with the help of SPSS 25. The results showed a positive and significant correlation between passive vocabulary mastery and reading comprehension, with a correlation coefficient (r) of 0.533. This indicates that students' reading comprehension of English literature improves with their level of passive vocabulary acquisition. It means that the development of students' vocabulary mastery is important to their reading comprehension. Therefore, teachers could implement more strategies to support students in becoming stronger and more confident readers. Additionally, the future researchers provide more insight into the correlation between passive vocabulary and reading comprehension in their research.

Keywords: correlation, passive vocabulary, reading comprehension

INTRODUCTION

Students must acquire four language skills in language learning: speaking, listening, reading, and writing. One of the essential skills for students especially, for EFL (English Foreign Language) students is reading comprehension. It involves obtaining meaning from a text through word recognition and interpretation. Reading comprehension entails comprehending the content of a text. According to Nofia (2019), some information can be obtained without reading, but reading may provide more information than listening. For example, reading a newspaper provides more information than watching the news on television. Reading enables individuals to access information that exceeds their initial search criteria, thereby underscoring its pivotal role in the acquisition of the English language.

According to Fahrozy (2023), reading comprehension can be defined as the cognitive process of understanding and interpreting written text. It involves the ability to grasp the meaning of words, sentences, and the overall content of a text, enabling readers to extract information and respond appropriately to the material they read. Reading entails acquiring knowledge and understanding by interpreting data from various written sources, including books, magazines, newspapers, and journals. Reading is an active process by which individuals derive meaning from written texts, efficiently extracting information.

Reading is a self-evident meaning-making process, but it can hardly be overstated that meaningful responses are at the heart of the reading process. It can and should involve all

kinds of thinking, evaluation, judgment, imagination, reasoning, and problem-solving. Not only are intellectual meanings involved, but also feelings can be stimulated, and emotional stances can be deeply changed by reading. Reading means more than just understanding the words or grammar when reading. Reading is thinking. To read well in English, you have to think in English.

The development of reading skills is directly correlated with the acquisition of vocabulary. According to Okkinga et al., (2023), vocabulary knowledge, including passive vocabulary mastery, plays a primary role in reading comprehension. Students with limited vocabulary may need help effectively applying reading strategies, which can result in cognitive overload and impede their overall reading comprehension growth. Passive vocabulary Mastery, or the set of words that an individual can recognize but does not actively utilize, has been demonstrated to considerably influence their reading comprehension abilities. The enhancement of vocabulary richness has been shown to facilitate the comprehension of texts, as there is a notable correlation between the knowledge of words and the success of comprehension. Students frequently need help to learn the meaning of texts, even the main idea. A lack of vocabulary represents a significant obstacle to understanding texts, resulting in poor performance in comprehension tests. This underscores the pivotal role of vocabulary in text comprehension.

According to Bellomo (2018), passive vocabulary mastery is what we recognize and understand when reading or listening, but we don't use it in our speech or writing. Developed by being exposed to language through others, not expressing our thoughts. Additionally, the depth and breadth of a person's passive vocabulary mastery can be classified into five levels: 2,000 words, 3,000 words, 5,000 words, university level (above 5,000 words), and 10,000 words. Each level is associated with a specific teaching and learning objective.

Reading is widely acknowledged that enhancing one's vocabulary is of significant benefit. It facilitates reading comprehension of written and auditory materials, and it enhances one's ability to communicate effectively in writing and speech. A deficiency in vocabulary can impede communication.

Vocabulary comprises the totality of words employed in a given language, each with a specific meaning. Additionally, vocabulary comprises smaller components, such as verbs, idioms, adverbs, and pronunciation. Historically, developing a solid vocabulary was considered an essential precursor to learning the four fundamental skills associated with language acquisition.

There are some previous studies related to this research. Ramadani and Azis (2021) talks about the correlation between students' vocabulary mastery and reading comprehension. This study revealed a correlation between students' vocabulary and reading abilities, with those demonstrating a similar average grade-level vocabulary and reading proficiency exhibiting a stronger correlation.

In addition, Achmad (2022), based on their research on the correlation between students' vocabulary mastery and reading comprehension, show a significant correlation or relationship between the variables of vocabulary mastery and reading comprehension. This means that the more English vocabulary the students have, the better their reading comprehension.

Abdullah. S., & Mukadar. S (2023) discuss the correlation between students' vocabulary mastery and reading comprehension. The researchers found a significant positive correlation. They state that students who score lower on vocabulary tests tend to score lower on reading comprehension tests.

Despite the acknowledged importance of vocabulary for reading comprehension, there remains a gap in the research concerning the specific role of passive vocabulary mastery. Most studies focus on the impact of active vocabulary on reading performance, neglecting how passive vocabulary contributes to comprehension. Furthermore, the nuanced relationship between passive vocabulary size and students' ability to comprehend more advanced texts has not been thoroughly explored. It is crucial to investigate how students' passive vocabulary can influence their reading comprehension, especially in more complex or academic contexts, where passive knowledge of words plays a significant role in understanding context, nuance, and implied meaning.

A student's ability to understand and process they encounter in reading materials, even if they are not actively using them, can significantly influence their ability to comprehend texts. This article examines the correlation between students' passive vocabulary mastery and their reading comprehension skills, discussing the theoretical foundations, relevant studies, and practical implications for educational practice.

RESEARCH METHOD

Research Design

This research used quantitative method design. According to Cresswell (2015), the quantitative research approach entails the collection of numerical data and the implementation of statistical procedures for its analysis. This would then inform the development of a theory based on the findings. Quantitative research employs a correlation method to ascertain the extent of a relationship between two variables. This research was conducted with two variables: dependent and independent. The dependent variable (X) for passive vocabulary mastery, while the independent variable (Y) for reading comprehension. The data presented in the results section show students' scores on the passive vocabulary mastery and reading comprehension tests. These data can be used to identify the correlation between students' vocabulary mastery and their reading comprehension.

Population and Sample

In this study, the researchers choose tenth-grade students of SMK PGRI 2 Kudus in the 2024/2025 academic year as the population with a total of 300 students. The sampling technique used is random sampling, with one class of tenth-grade students chosen.

Instrument

To obtain data from the students, the researchers used a multiple-choice test as the instrument of this study. Arikunto and Jabar (2014) defines a test as a series of questions or exercises and other tools employed to measure individuals' or groups' skills, knowledge, intelligence, abilities, or talents. The multiple-choice test consisted of 40 items which were divided into: 20 items for the passive vocabulary test and 20 items for the reading comprehension test.

Data Collection

To collect the data, students had to select the correct answer for both tests by crossing one of the four options (A, B, C, or D). The score for a correct answer is one (+1), while an incorrect answer resulted in a score of zero (0). The students' scores were calculated using the formula. The researchers also did the validity and reliability testing to know the measurement of the test instrument.

Validity

Table 1

Validity of Passive Vocabulary test

No.	Validity		Criteria
	r count	r table	
1.	0,460		VALID
2.	0,648		VALID
3.	0,646		VALID
4.	0,646		VALID
5.	0,499		VALID
6.	0,533		VALID
7.	0,613		VALID
8.	0,380		VALID
9.	0,416		VALID
10.	0,467	0,374	VALID
11.	0,379		VALID
12.	0,434		VALID
13.	0,533		VALID
14.	0,377		VALID
15.	0,648		VALID
16.	0,408		VALID
17.	0,398		VALID
18.	0,456		VALID
19.	0,376		VALID
20.	0, 380		VALID

From above result, the researchers compared the observed value ($r_{observed}$) to the critical value (r_{table}) at a 5% significance level, which is 0.374 (df = N - 2 = 28). For each question to be considered valid, the observed value ($r_{observed}$) should be higher than the critical value (r_{table}). If the observed value is lower than the critical value, it means the question is not strongly related to the total score, and it should either be removed or corrected.

Table 2

Validity of reading Comprehension test

No.	Validity		Criteria
	r count	r table	
1.	0,478		VALID
2.	0,380		VALID
3.	0,387	0,374	VALID
4.	0,499		VALID
5.	0,410		VALID

6.	0,663	VALID
7.	0,515	VALID
8.	0,552	VALID
9.	0,376	VALID
10.	0,480	VALID
11.	0,417	VALID
12.	0,420	VALID
13.	0,627	VALID
14.	0,805	VALID
15.	0,629	VALID
16.	0,398	VALID
17.	0,699	VALID
18.	0,480	VALID
19.	0,805	VALID
20.	0,478	VALID

From above result, the researchers compared the observed value ($r_{observed}$) to the critical value (r_{table}) at a 5% significance level, which is 0.374 (df = N - 2 = 28). For each question to be considered valid, the observed value ($r_{observed}$) should be higher than the critical value (r_{table}). If the observed value is lower than the critical value, it means the question is not strongly related to the total score and should either be removed or corrected.

Reliability is defined as the precision of measurement. This precision is characterized by the reproducibility of results, which are consistent when measurements are performed repeatedly, using different instruments or by different individuals. The table below shows the categories of reliability tests. These tests determine the reliability of the test.

Reliability

Reliability is defined as the precision of measurement. This precision is characterized by the reproducibility of results, which are consistent when measurements are performed repeatedly, using different instruments or by different individuals. The table below shows the categories of reliability tests. These tests determine the reliability of the test.

Table 3

Interpretation of Reliability Coefficients

Reliability Coefficients (r)	Interpretation
$0,00 \leq r < 0,20$	Very Low
$0,20 \leq r < 0,40$	Low
$0,40 \leq r < 0,60$	Moderate
$0,60 \leq r < 0,80$	High
$0,80 \leq r < 1.00$	Very High

Data Analysis

After collecting data, the next step of the research is analyzing data. The data analyzed by using the Pearson Product-Moment Correlation Formula to evaluate the correlation between the two variables. The result of the data analysis was an identification of a correlation between students' passive vocabulary mastery and reading comprehension.

RESULTS AND DISCUSSION

Result

The purpose of this study is to determine whether reading comprehension and vocabulary competence are related. The correlational method was used in the author's quantitative research strategy, which included statistical computations. Both a reading test and a vocabulary test were used in the study. The participants had to finish both tests, each of which included 20 questions. Following the completion of the study with a sample of thirty students, the researchers obtained the reading comprehension and passive vocabulary test results. Every right response received a score of 1, and every wrong response received a score of 0.

Student's score of Passive Vocabulary test

The results of the passive vocabulary test were calculated using SPSS 25 to find the students' final scores. The table below shows the average score of the students on the vocabulary test:

Table 4
Student's mean score of passive vocabulary test

	N	Minimum	Maximum	Mean	Std. Deviation
Vocabulary	30	25.00	90.00	52.5000	14.42878
Valid N	30				

The table shows that the average score of the 30 students is 52.5, with a standard deviation of 14.4. It also shows that the highest score on the passive vocabulary test was 90, and the lowest score was 25.

Mean of Reading Comprehension test

The results of the reading test were calculated using SPSS 25 to find the students' final scores. The table below shows the average score of the students on the reading test:

Table 5
Students' mean score of reading comprehension test

	N	Minimum	Maximum	Mean	Std. Deviation
Reading	30	40.00	90.00	67.5000	10.80788
Valid N	30				

The table shows that the average score of the 30 students is 67.5, with a standard deviation of 10.8. It also shows that the highest score on the reading comprehension test was 90, and the lowest score was 40.

Correlation Between Passive Vocabulary and Reading Comprehension

In order to ascertain the correlation between students' passive vocabulary mastery and reading comprehension, the researchers employed the Pearson Product-Moment Correlation, using SPSS 25 to ease the data analysis. To ensure the integrity of the data, a normality test was conducted beforehand to determine whether the data had been drawn from a normally distributed population. The Kolmogorov-Smirnov test was utilized in this study. The following table presents the results of the normality test using the Kolmogorov-Smirnov method:

Table 6
Normality Test
One-Sample Kolmogorov-Smirnov Test

		Vocabulary	Reading
N		30	30
Normal Parameters[a,b]	Mean	52.5000	67.5000
	Std. Deviation	14.42878	10.80788
Most Extreme Differences	Absolute	.131	.111
	Positive	.131	.111
	Negative	-.131	-.109
Test Statistic		.131	.111
Asymp. Sig. (2-tailed)		.198[c]	.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.

The results of the Kolmogorov-Smirnov normality test indicated a significance level of 0.20 for vocabulary and 0.19 for reading, suggesting that the data were normally distributed.

Following the acquisition of the results of the normality test, the researchers proceeded to analyze the correlation between passive vocabulary mastery and the reading comprehension test utilizing Pearson Product-Moment Correlation. The ensuing table presents the correlation result between vocabulary and reading tests:

Table 7

Correlation between passive vocabulary and reading comprehension test

		Vocabulary	Reading
Vocabulary	Pearson Correlation	1	.533[**]
	Sig. (2-tailed)		.002
	N	30	30
Reading	Pearson Correlation	.533[**]	1
	Sig. (2-tailed)	.002	
	N	30	30

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

As indicated by the table, the correlation result demonstrated a coefficient correlation (r_{value}) of 0.533 between the students' passive vocabulary score and reading score. To identify the significance of the correlation between the two variables, the researchers employed a two-tailed test. The table revealed a strong correlation (r_{value} of 0.533) between the students' passive vocabulary test and reading test.

To assess whether the correlation is acceptable, the researchers determined the degree of freedom (df) using the formula $df = N - 2$. The researchers found that the degree of freedom (df) is 28 ($df = 30 - 2 = 28$). The researchers then examined the r_{value} and the r_{table} to determine the correlation between the two variables. At the 5% significance level (0.05) and $df = 28$, the r_{table} value was 0.374. The r_{value} (0.533) was higher than the r_{table} value (0.374). This finding indicates that a significant correlation between the two variables.

The result indicated that the t_{value} was 3.333. By utilizing df 28, the t_{table} at a significant level of 5% (0.05) was determined to be 2.048. The final step involved a comparison of the t_{value} with the t_{table} to ascertain the acceptability of the correlation. The outcome of this analysis revealed that the t_{value} (3.333) was higher than the t_{table} (2.048), indicating a positive correlation between the two variables.

The results show that the t_{value} is 3.333, while the t_{table} value at a 5% significance level (0.05) is 2.048. Since the t_{value} is greater than the t_{table} value, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. Therefore, it can be concluded that a significant relationship exists between passive vocabulary mastery and reading comprehension.

Discussion

Based on the result of findings, there is a significant variation in the level of vocabulary mastery among the students. While some students demonstrated a strong vocabulary foundation, others struggled to grasp vocabulary knowledge.

These differences in vocabulary mastery may be due to different levels of English exposure, study habits, and prior learning experiences. The validity and reliability tests confirmed that the vocabulary test was effective in assessing students' vocabulary knowledge. However, the results suggest that additional instructional support is needed to improve students' vocabulary acquisition, which in turn would improve their overall language proficiency.

Based on the results of the study, the researchers identified a significant correlation between passive vocabulary and reading comprehension. According to Ratnaningsih & Clara (2021), the benefit of passive vocabulary is its role in improving comprehension, as it enhances reading skills and helps individuals understand the context and meaning of different texts. Beginners should approach reading as a deliberate activity where they know what to do. Three elements are necessary for academic reading, making it a multifaceted and complicated process: thorough and substantial reading, material synthesis from a variety of sources, and active participation in identifying authors' intentions (Giawa & Panjaitan, 2021).

Meanwhile, when compared with their passive vocabulary students demonstrated higher performance in the area of reading comprehension. This finding suggests the possibility of students encountering difficulties with vocabulary, yet the development of compensatory strategies such as inference, context clues, and prior knowledge might facilitate their comprehension of written texts.

Students with higher reading comprehension scores understand the overall meaning of passages, even if they struggle with individual words. Vocabulary mastery improves reading

comprehension by allowing for a more efficient and accurate understanding of texts. The findings highlight the importance of integrating reading comprehension activities with vocabulary instruction. Educators can foster vocabulary growth and comprehension skills by facilitating students' engagement with a variety of reading materials and explicit vocabulary strategies. The test of validity and reliability confirmed the efficacy of the reading comprehension test in evaluating students' reading skills.

Following the acquisition of the data, the researchers employed the SPSS 25 software to calculate the data using the Pearson Product-Moment Correlation method. The data underwent analysis to ascertain the presence of a significant correlation between the two variables. The calculation indicated that the correlation coefficient (r) was 0.533 with moderate category, suggesting a substantial correlation between students' passive vocabulary mastery and reading comprehension. Vocabulary plays an essential role in reading comprehension. It enables readers to understand the meaning of words, which is necessary for grasping the overall message of a text.

Since the findings of this study confirm a significant relationship between students' vocabulary mastery and reading comprehension, the researchers compare these results with those of previous studies. One relevant study by Ramadani and Aziz (2021), titled "The Correlation Between Students' Vocabulary Mastery and Reading Comprehension", reported similar findings, further supporting the conclusions of this research. Ramadani and Azis (2021), conducted their study using the same subjects and research instruments. The findings revealed a correlation of 0.914, indicating a very strong relationship between vocabulary mastery and reading comprehension. Another relevant study was conducted by Achmad (2022), titled "The Correlation between Students' Vocabulary Mastery and Reading Comprehension." This study also found similar results, with a correlation coefficient (r) of 0.546, indicating a strong relationship between vocabulary mastery and reading comprehension. The key difference is that Achmad research focused more specifically on passive vocabulary and analyzed the scores of students who completed both the passive vocabulary and reading comprehension tests. Despite this distinction, the findings of Marwah's study support the results of the present research, confirming a significant correlation between passive vocabulary mastery and reading comprehension.

In addition, Sarena, Anayati, and Suhendi (2023) found that there is a relationship between students' reading comprehension and vocabulary knowledge. Given that the result fell into the "strong" category, it may be regarded as a high association. The comprehension of the material by students is facilitated by three factors: their command of terminology, the author's approach to the subject matter, and their prior knowledge. Since vocabulary and reading comprehension are closely related, teachers should teach vocabulary to their pupils in order to improve their reading comprehension. A large vocabulary facilitates students' comprehension of the material. While students' reading strategies and experiences aid in their comprehension of a material, vocabulary knowledge has a more significant role.

CONCLUSION

Based on the result of this study, it can be concluded that there is a significant correlation between students' passive vocabulary mastery and their reading comprehension among tenth-grade students at SMK PGRI 2 Kudus in Kudus in the 2024/2025 academic year. The researchers found a correlation coefficient of 0.533, indicating a moderate but significant correlation between the two variables. Despite the differences in reading and vocabulary test results, there is a moderate correlation. It can be brought on by the challenging vocabulary in the test questions. Students with good reading scores also have excellent vocabulary scores.

Numerous elements contribute to students' understanding of the reading content. The findings indicate that the variables are the prior knowledge of the students. as well as their experiences. These elements have the potential to facilitate students' comprehension of the reading comprehension. When they came across unfamiliar terms, they could use the text to infer their meaning. The researchers proposed that subsequent studies could concentrate on interventions that specifically target enhancing passive vocabulary and measuring how this impacts students' reading comprehension in real-time. This would allow for the formulation of practical recommendations for language learning programs.

REFERENCES

Abdullah, S., & Mukadar, S. (2023). The Correlation Between Students Vocabulary Mastery and Reading Comprehension at The Second Grade of SMA Negeri 10 Kota Ternate. *Educatum: Scientific Journal of Education*, *1*(1), 13-19. https://doi.org/10.59165/educatum.v1i1.6

Achmad, M. (2022). The Correlation between Students' Vocabulary Mastery and Reading Comprehension of Students at SMA Negeri 13 Makassar. *EDULEC: Education, Language, and Culture Journal*, *2*(3), 205-218. https://doi.org/10.56314/edulec.v2i3.59

Arikunto, S., & Jabar, C. S. A. (2014). Evaluasi Program Pendidikan: Pedoman Teoritis Praktisi Pendidikan.

Bahri, D. S. (2018). The Correlation Between Students' vocabulary Mastery and Their Reading Comprehension at The Seventh Grade Students of MTS Daarul Ihsan. *PROJECT (Professional Journal of English Education)*, *1*(2), 77-84. https://doi.org/10.22460/project.v1i2.p77-84

Bellomo, T. S. (2018). Morphological Awareness and Recall of Passive Vocabulary in Adult Learners. *English Linguistics Research*, *7*(1), 34.

Bishry, H. (2018). The Correlation between vocabulary mastery and reading comprehension. *Tarbawi: Jurnal Ilmu Pendidikan*, *14*(2), 63-68. https://doi.org/10.32939/tarbawi.v14i2.292

Bruggink, M., Swart, N., van der Lee, A., & Segers, E. (2022). Theories of Reading Comprehension: The Current State of Affairs on Reading Comprehension Research. In *Putting PIRLS to Use in Classrooms Across the Globe: Evidence-Based Contributions for Teaching Reading Comprehension in a Multilingual Context* (pp. 3-19). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-95266-2_1

Creswell, J. W. (2015). Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research. Pearson.

Fahrozy, F. P. N. (2023). Pemahaman Membaca dan Siswa Kesulitan Memahami Soal Cerita Matematika di SekolahDasar. *Jurnal Elementaria Edukasia*, *6*(2), 430-441. https://doi.org/10.31949/jee.v6i2.5296

Ferreira, L. Helena. (2007). How to Teach Vocabulary Effectively: An Analysis of The Course Book Eye and Spies. Praia. Available online http://www.portaldoconhecimento.gov.cv/

Furqon, F. (2013). Correlation Between Students' Vocabulary Mastery and Their Reading Comprehension. *Journal of English and education*, *1*(1), 68-80.

Giawa, Y., & Panjaitan, N. B. (2021). The Correlation Between Students' Vocabulary Mastery and Reading Comprehension : A Meta Analysis. *Jurnal Bahasa Inggris Terapan*, 7(1), 45-60. https://doi.org/10.35313/jbit.v7i2.3519

Hiebert, E. H., & Kamil, M. L. (2005). *Teaching and learning vocabulary: Bringing research to practice*. Routledge.

Nofia, N. (2019). The Correlation of The Tenth Grade Student's Vocabulary Mastery and Reading Comprehension At SMA Negeri 6 Tangerang. *Globish: An English-Indonesian Journal for English, Education, and Culture*, *8*(2), 94-103. http://dx.doi.org/10.31000/globish.v8i2.1755

Okkinga, M., Gelderen, A. V., Schooten, E. V., Steensel, R. V., & Sleegers, P. J. C. (2023). Does Vocabulary Knowledge Matter in The Effectiveness of Instructing Reading Strategies? Differential Responses from Adolescents with Low Academic Achievement on Growth in Reading Comprehension. *Reading and Writing*, *36*(10), 2549-2575. https://doi.org/10.1007/s11145-022-10359-2

Ramadani, S., & Azis, A. (2021). The Correlation Between Student's Vocabulary Mastery and Reading Comprehension. *Journal of Language Testing and Assessment*, *1*(2), 197-208. https://doi.org/10.56983/jlta.v1i2.240

Ratnaningsih, P. W., & Clara, C. (2021). The Effect of Vocabulary Towards Writing Skill with Reading Skill as Moderating Effect. *6*(2), 228–245. https://doi.org/10.33369/JOALL.V6I2.13670

Sarena, L. A., Anayati, W., & Suhendi, A. (2023). The Correlation Between Students' Vocabulary And Their Descriptive Reading Comprehension. *Journal of Language* , 5 (2), 392-400. https://jurnal.uisu.ac.id/index.php/journaloflanguage

Wallace, M. J. (1982). Teaching vocabulary. RELC Journal, 14(2), 121–122. https://doi.org/10.1177/003368828301400217

Weganofa, R., & Lutviana, R. (2018). The Correlation Between Internet Literacy and Passive Vocabulary Size. *Lingua Cultura*, 12(4), 339-343. https://doi.org/10.21512/lc.v12i4.4113