IDEAS

Investigating the Effects of Problem Based Learning on Students' Vocabulary Mastery

Agrissto Bintang Aji Pradana[1*], Putri Meinita Triana[2], Aditia Eska Wardana[3]
[1]agrisstobintang@ummgl.ac.id, [2]putri.meinita@ummgl.ac.id
[3]aditiawardana@ummgl.ac.id
[123]Pendidikan Guru Sekolah Dasar, Universitas Muhammadiyah Magelang

Abstract

Vocabulary mastery has crucial roles in language learning. Learners would be unable to engage in language development activities such as grammar, reading, and writing if they did not have adequate vocabulary. However, many elementary school students lack sufficient vocabulary and are less capable of using them properly. Therefore, this study was conducted to determine the effects of Problem Based Learning model on improving students' vocabulary mastery. It involved 18 four-grade students living in Secang, Magelang. Due to interaction restriction on Pandemic era, it was not conducted at school. They were gathered at a village hall. Quasi-Experimental Design with One group pre-test post-test was employed in this study. The treatment was conducted within 4 meetings. The data were retrieved through tests which consist of 30 multiple-choice items. They were assumed to be valid by Product Moment Test. Then they were statistically analyzed using Paired Sample t-test. The result revealed that Asymp Sig (2-tailed) was 0.000 and the t value was 14.806 > t table 2.10982. Hence, there was a positive and significant influence of Problem Based Learning in increasing students' vocabulary mastery.

Keywords: English; mastery; problem; vocabulary

Introduction

Vocabulary is an essential part of language. It is defined as the collection of all words that may reflect their understand on how the vocabulary is used. The more vocabulary people have, the better their speaking skills will be. Vocabulary is crucial in communication. It means if a learner without sufficient vocabulary he will be unable to convey his thoughts and ideas as well as he would want both orally and in writing (Bueno-Alastuey and Nemeth 2020). In classroom settings, students have

ideas to express, but due to the lack of English vocabulary, they cannot be successfully delivered. Grammar is another most crucial language skills. This pertains to people's capacity to construct proper and organized sentences. Grammar, on the other hand, cannot convey feelings or ideas. People with a wide range of vocabulary will find it simpler to tie words together to form phrases or paragraphs. Ideas may not require a perfect sentence structure to comprehend.

The significance of vocabulary mastering allows researchers to conduct studies such as on enhancing English vocabulary mastery. Several studies have been conducted related to the use of technology and digital material (Cetinkaya and Sutcu 2019; Jafari and Chalak 2016; Motlagh et al. 2020). Later Mukhlif & Challob (2021) examine the efficacy of using Facebook against traditional training in enrich the vocabulary knowledge of Iraqi EFL secondary school students. According to the findings, the usage of FOLP was substantially more successful in enhancing the vocabulary mastery of EFL students in the experimental group than in the control group, as stated by their mean post-test scores. Several variables also contributed to their success in increasing English vocabulary mastery. It also found a few variables that impacted EFL students' learning of English vocabulary, such as good students dominating conversation and work, technical issues, and social loafing.

Another study Tachom (2021), found that narrative approach and Task-Based Language Teaching assisted pupils in improving their English vocabulary mastery. The findings also show that pupils were given more opportunities to use language in realistic ways. They get extra time to hone their vocabulary from the stories. The participation of group members helped them in learning new vocabulary.   And the students' prior knowledge of Thai folktales assisted them in forming links between their past knowledge and the target language. It is stated that past knowledge of the learners benefited in the production of new information. Then, an experimental study conducted by Chen & Wang (2021) revealed that varied color matching features had a substantial effect on English word memorizing performance. Statistically, it indicated that there were substantial variations in the memorization of English language among four color attribute combinations, and contrast of hue outperformed two other color characteristics in the combinations.

Syafrizal et al. (2021) conducted a study on the use of whiteboard animation in EFL classroom. During the teaching-learning process, whiteboard animation helped participants better comprehend the content conveyed by the teacher. That is, the whiteboard animation performed on the experimental group greatly improved pupils' vocabulary mastery. The impact size was categorized as medium. The optimization of technology application in EFL classroom was also performed by Pahamzah et al. (2022) in their study. Software Kahoot learning media may boost motivation and enthusiasm for learning English and make it simpler to absorb the information, particularly reading that is deemed difficult to understand and boring. The use of technology as an innovation in English learning medium, such as Software Kahoot, can promote learning.

According to the studies above, using technology applications in learning has a

favorable influence on enhancing vocabulary mastery (Mukhlif and Challob 2021; Pahamzah et al. 2022). There is additional research into the use of task-based language instruction (Tachom 2021). Most of the previous studies discussed the use of technological applications or devices in improving students' vocabulary mastery. Actually, learners' vocabulary may be gained from their surroundings. It concerns the way people apply learning to their daily lives. In terms of vocabulary mastery, it is determined by how effectively they recall and incorporate words functionally into language products. Problem-based learning is one of the learning approaches that allows learners to explore their surroundings. It gives significant impacts on the increase of students' vocabulary (Chai and Swanto 2020). This model promotes critical thinking and language acquisition in order to address challenges drawn from students' real-life issues. Iswandari, Prayogo, and Cahyono (2017) in their research revealed that Environmental PBL instruction delivered to eleventh grade Indonesian EFL students had a substantial impact on their accomplishment of environment-related vocabulary and writing abilities. This prior study investigates the use of problem-based learning in vocabulary mastery, which will have an impact on each student's vocabulary knowledge.

The learning model plays a significant role in vocabulary mastery since it promotes the activity of comprehending and mastering language in its varied roles and situations. To achieve its goals, this study aims to answer the following questions:
Does problem-based learning effect on students' vocabulary mastery?

Method

This study employed quasi-experimental design with one group pretest posttest type. This study was conducted during a pandemic. So, students were gathered at a village hall of Secang District, Magelang in 2020. There were 28 grade students considered to be population. However, only 18 students were finally assigned as the sample. Data collection was conducted through tests. To valid the instrument, expert judgements were done involving an English lecturer and an English primary teacher. Then it was also validated using product moment test. Table 1 presents the result of the validity test.

Table 1. Result of Product Moment Test

No	r	Validity
1	0,458	Valid
2	0,296	Invalid
3	0,296	Invalid
4	0,209	Invalid
5	0,542	Valid
6	0,257	Invalid
7	0,757	Valid
8	0,672	Valid
9	0,417	Invalid

10	0,684	Valid
11	0,236	Invalid
12	0,628	Valid
13	0,638	Valid
14	0,424	Invalid
15	0,555	Valid
16	0,490	Valid
17	0,362	Invalid
18	0,588	Valid
19	0,661	Valid
20	0,441	Invalid
21	0,514	Valid
22	0,739	Valid
23	0,652	Valid
24	0,408	Invalid
25	0,412	Invalid
26	0,370	Invalid
27	0,535	Valid
28	0,591	Valid
29	0,591	Valid
30	0,613	Valid
31	0,568	Valid
32	-0,069	Invalid
33	0,361	Invalid
34	0,495	Valid
35	0,396	Invalid
36	0,362	Invalid
37	-0,215	Invalid
38	0,553	Valid
39	0,011	Invalid
40	0,397	Invalid

With sig. 5%, r was compared to r_{table} (0.444). 21 items were assumed to be valid. Then one of them was eliminated so there were 20 items administered in this study.

Besides, reliability of the test items was then examined using Cronbach's alpha to seek internal consistency. The alpha coefficient for the 21 items was 0.915. It suggested that they had relatively high internal consistency. It was compared to r table 0.005. The result is presented in Table 2.

Table 2. Result of Cronbach's Alpha Test

Cronbach's Alpha	N of items
.915	21

The treatment in this study consisted of 4 meetings conducted by applying

Problem Based Learning using letter cards attached to a board. At the beginning of learning students are given problems that require them to arrange letters into a word in. Then they will use it in a sentence gap. There are various topics discussed in learning such as things in the yard, things in the bedroom and bathroom, things in the classroom, and things in the kitchen.

Then normality was tested by using Shapiro-Wilk. It was used to examine if the data were normally distributed. They were assumed to be normal if value of the test was higher than sig. 0.05. To test the hypothesis, paired sample t-test was employed. It was attempted to examine if Problem Based Learning effected students' vocabulary mastery.

Results

The research question is if problem-based learning effects on students' vocabulary mastery. Pretest was taken before giving the treatment. It covered a set of multiple-choice questions on English vocabulary on "Items around us". Students' vocabulary was still low and below the passing grade. The result revealed none of them passed the standard of minimum competence.   The average score was 48. The highest score was only 57, while the lowest one was 33.
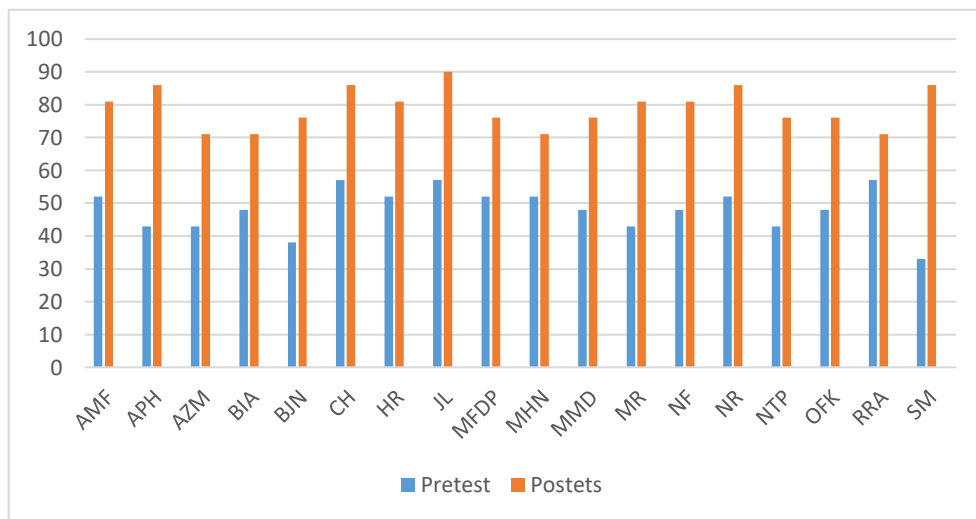

Figure 1. Diagram of Score Distribution

Later, as sample, 18 students were treated by using the Problem Based Learning. Here, numbers of flashcards were used to assist the activities. The treatment was conducted in four meetings and the materials were derived from basic competencies and the existing curriculum. After the treatment, students took a post test. The result revealed that all students successfully pass the standard of minimum competence. The score was 79 with 90 as the greatest score, while the lowest one was 71. Pretest and post test scores can be seen as presented in Figure 1.

Then the normality test was used to determine if the data obtained was normally distributed from a normal population. The IBM SPSS Statistics 24

application is used to carry out the test, and the Shapiro-Wilk test was utilized to determine normality. If the sig value is more than 0.05, the sample was normally distributed; otherwise, the sample was not normally distributed. According to Table 3, Shapiro Wilk's value is 0.180 and 0.072, which are both more than 0.05, indicating that the data is normally distributed.

Table 3. Result of Shapiro Wilk Test

Test of Normality				
		Shapiro-Wilk		
	Experiment	Statistic	df	Sig.
Pretest	1	,928	18	,180
Posttest	1	,906	18	,072

Once the data were determined to be normally distributed, a hypothesis test was carried out. The paired sample t test was employed to examine the difference between pretest and posttest means as well as the influence of PBL on students' vocabulary mastery. According to Table 4, t $_{value}$ was -14.806. t value was negative since the average score of vocabulary mastery of pretest was lower than posttest. In this case, the negative t value could be interpreted positive so it became 14.806. The t $_{table}$ was assumed from degree of freedom (df) and the significance value (Sig. 2-tailed). Table 3 showed that df was 17 and t $_{table}$ was 2.10982. In sum, t $_{value}$ (14.806) > t $_{table}$ 2.10982. It could be stated that H$_o$ was rejected while H$_a$ was accepted.

Table 4. Result of Paired Sample t test

		Paired Differences							
					95% Confidence Interval of the Difference				Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
Pair 1	PRETEST - POSTEST	- 30,889	8,851	2,086	-35,290	-26,487	- 14,806	17	,000

Discussion

According to the findings of preliminary observations, the students' vocabulary mastery remained lower than standard of minimum competence. The teacher rarely used the media and appropriate model in English classroom activities to assist students grasp English vocabulary. The aim of this study is to see how the problem based learning affects English vocabulary mastery. It offered the advantage of increasing student learning activities, developing students' critical thinking, and teaching students how to transfer their knowledge to grasp situations in their actual lives.

According to statistical calculations, the t $_{value}$ is greater than the t $_{table}$, indicating that the learning model variable has an effect on vocabulary mastery. The difference in pretest and posttest findings reported in Table 4 confirmed this, with

means of pretest score of 48 and a posttest score of 79. There was an increase based on this average difference.

They might urge kids to look at photos and link letters to form a vocabulary with flashcards that they use during learning. This increases students' motivation to learn English language. Students can learn to solve problems through group discussion using PBL models. It may be noticed on the phases of inquiry and investigation group that encourages students to exchange ideas while issue solving (Bashith and Amin 2017). Students will understand the materials conveyed when they were engaged and enthusiastic to take part in activities. It clearly reveals a high level of student's learning engagement in that students can get experience working collaboratively with their group members (Mali 2016). Likewise, it also developed students' critical thinking since they were ordered to discuss in groups (Alek 2019) about appropriate vocabulary.

Conclusion

Problem-based learning encouraged students to think critically as they solve issues involving the contextual use of the vocabulary. Using flashcards to learn also helped students memorize visually and accurately put letters and sentences. The pretest and posttest results revealed that their vocabulary mastery improved. Supported by the findings of statistical calculations indicating that PBL affected their vocabulary mastery. However, this study had limitations because the sample size was relatively small. The treatment was also rather short, with only four meetings. In line, the authors also suggested that this topic could be taken into account with larger sample. Furthermore, materials, student responses in this topic could become a potential area to be explored in considerable depth.

Acknowledgement

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