# THE USE OF CROSSWORD PUZZLE GAME AND CLUSTERING TECHNIQUE ON VOCABULARY SIZE

**Bagus Alghani\*, Cucu Sutarsyah, Ari Nurweni**

*\*Corresponding author,* +6285789987836, email: bagus_alghani@yahoo.com

***Abstract: The Use of Crossword Puzzle Game and Clustering Technique on Vocabulary Size.*** The objective of this research was to investigate the difference of vocabulary size between extrovert and introvert students who were taught through crossword puzzle game and clustering technique at the first year of SMA Negeri 1 Purbolinggo. The researcher used two classes as experimental classes, which consisted of 36 students for each. The research used factorial design. Based on the findings, it could be drawn that there was an interaction between the techniques and personalities in students' vocabulary size. The techniques differed significantly with the students performing better in clustering technique. Extroverts did better than introverts regardless of the techniques. Therefore, using crossword puzzle game and clustering technique was a perfect way for extrovert students to improve their vocabulary size since their score increased through those techniques.

*Keywords: vocabulary size, crossword puzzle game, clustering technique*

**Abstrak: Penggunaan Teka-teki Silang dan Teknik Pengelompokan terhadap Ukuran Kosakata.** Tujuan dari penelitian ini adalah menyelidiki perbedaan ukuran kosakata antara siswa ekstrovert dan introvert yang diajarkan melalui teka-teki silang dan teknik pengelompokan pada tahun pertama di SMA Negeri 1 Purbolinggo. Peneliti menggunakan dua kelas sebagai kelas eksperimen yang terdiri dari 36 siswa pada setiap kelas. Penelitian ini menggunakan desain faktorial. Berdasarkan temuan, dapat ditarik kesimpulan bahwa ada interaksi antara teknik dan kepribadian dalam ukuran kosakata siswa. Teknik-teknik berbeda secara signifikan bahwa siswa lebih baik dalam teknik pengelompokan. Siswa ekstrovert lebih baik daripada introvert apapun tekniknya. Oleh karena itu, menggunakan teka-teki silang dan teknik pengelompokan adalah cara sempurna bagi siswa ekstrovert untuk meningkatkan kosakata mereka karena skor mereka meningkat melalui teknik-teknik tersebut.

*Kata kunci: ukuran kosakata, teka-teki silang, teknik pengelompokan*

## INTRODUCTION

The purpose of teaching English as a foreign language in Indonesia is to enable students to master the aspects of language, i.e., structure and vocabulary, in order to reach a high degree of competence in English. In relation to this, the most important aspect of language learning is vocabulary. Because it has complicated components to be mastered, such as meaning, form, and the use of the word itself, it also becomes an important thing to choose a good technique when a teacher teaches vocabulary in the class. As supported by Richards and Renandya (2002:255), vocabulary is

a core component of language proficiency and provides much of the basis of how well learners speak, listen, and write. It points out that, without adequate knowledge of vocabulary, language learners are generally impeded in their academic activities.

To overcome the problems mentioned, learners take a lot of time to develop their vocabulary. However, their efforts seem to be futile since they do not know how to master vocabulary. With reference to this matter, how students learn vocabulary effectively is a fundamental problem. In another word, to investigate how the students master vocabulary is also the primary reason to the interpretation of the discovery in vocabulary learning. Learning vocabulary in the foreign language requires the use of vocabulary teaching techniques which have been receiving much attention in the field of foreign language learning. Schmitt (2000) states that understanding of the nature and significance of vocabulary knowledge in a second language therefore needs to play a much more central role in the knowledge base of language teachers. Due to the paramount role of vocabulary mentioned above, it is important to find the effective ways to teach vocabulary. Consequently, it is the teacher's task to create and determine the technique that can be used to teach and improve students' vocabulary. The technique should be able to encourage and motivate them to learn. As affirmed by Serna and Ajor (2011), they state that the use of educational games can help to generate more positive feelings about the subject matter and to enhance learning outcome. Thus, the lesson is more easily digested by the students and they are involved in the activities directly because games give a pleasant variation in learning.

One of the games for students studying English is crossword puzzle game. According to Orawiwatnakul (2013:417), crossword puzzle is a puzzle filled in all the blank squares with letters that form words. The words are based on the clues provided, which can be complete sentences, phrases, or words. In addition to the process of students solving puzzles, Jaramillo, et al (2012:213) proposes that another important consideration is their involvement in the design process. It means that crossword puzzles can be used for teaching a specific subject especially since they can be adapted and tailored in limitless ways.

Clustering technique is a good way to turn a broad subject into a limited and more manageable way in teaching vocabulary. It is also called mapping, webbing, looping, or diagramming. It is another productive way to gather information for an essay in writing skill and also in teaching vocabulary. Clustering uses free association. Clustering is a prewriting technique used by writers to produce ideas. To cluster ideas, it begins with a blank sheet of paper. It starts by writing the topic in a circle in the middle of your paper. As set of related ideas, then write the ideas in smaller circles around the first circle. The related idea in each small circle may produce even more ideas, and therefore more circles, around it (Oshima, et al, 1999:48). Thus, a vocabulary cluster is an approach to

learning words by associating them into different related groups (KhaliliSabet, 2015:209).

Based on the background above, the problems arouse are:
1. Is there any interaction between the techniques and personality of students?
2. Is there any significant difference in vocabulary size of introvert and extrovert students who use crossword puzzle game?
3. Is there any significant difference in vocabulary size of introvert and extrovert students who use clustering technique?
4. Is there any significant difference in vocabulary size of introvert students taught through crossword puzzle game and clustering technique?
5. Is there any significant difference in vocabulary size of extrovert students taught through crossword puzzle game and clustering technique?

**METHODS**
This research used quantitative approach. The design of this research was factorial design. According to Hatch and Lazaration (1991:369), factorial designs are those where more than one independent variable is involved in the design. Since factorial design was the most common way to study the effect of two or more independent variables and focused on the design that had only two independent variables that combined all levels of the other independent variables to produce all possible conditions, this research was suitable with this design. The population of this research was the first grade students at SMAN 1 Purbolinggo in 2016/2017 academic year. The research took two classes in the school as the sample. The samples were X MIA 3 and X MIA 4 as experimental classes, which consisted of 36 students for each. By using the result of the questionnaire, the researcher classified the students into introvert and extrovert personalities. The questionnaire was in Indonesian in order to minimize the misinterpretation by the students which was adapted from Eysenck's theory (1981). Then, the researcher gave the word-definition-matching format (WDMF) which was constructed by Sutarsyah (2006), to measure students' vocabulary size.

**RESULTS**
The first hypothesis was tested using Anova and the result was depicted on the graph of interaction between the techniques and the personalities below.
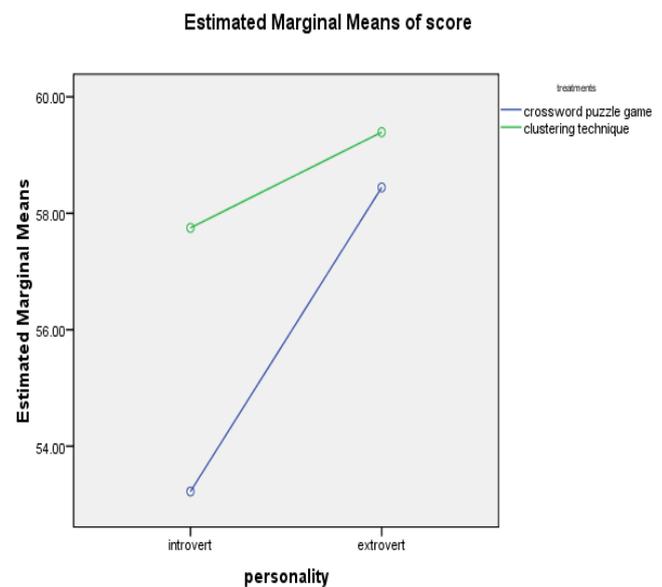


**Figure 1. Graph of Interaction between Techniques and Personality in Vocabulary Size**

The graph on the figure above draws that there is an interaction between the techniques and the personalities

in students' vocabulary size. The mean score of crossword puzzle game for introvert students was 53.22 and 58.44 for extrovert students. Meanwhile, the mean score of clustering technique for introvert students was 57.75 and 59.4 for extrovert students.

To determine the difference in the students' vocabulary size, the second hypothesis was tested by t-test which $\alpha < 0.05$. There is a difference of mean score between introvert and extrovert students who used crossword puzzle game. The mean score of introvert students who used crossword puzzle game was 53.22 and 58.44 for extrovert students. It also shows that there is a difference between $A_1B_1$ and $A_1B_2$, because the result of the value test was $t_{ratio} = 13.757$ and $26.135 > t_{table} = 2.021$ for n=36. The result indicates that there is a difference, meaning that the $H_o$ is rejected. The mean score of extrovert students who used crossword puzzle game was higher than introvert students. In other words, learning by crossword puzzle game in extrovert students is better than introvert students.

In addition, the third hypothesis showed that there is a difference of mean score between introvert and extrovert students who used clustering technique. The mean score of introvert students who used clustering technique was 57.75 and 59.39 for extrovert students. It also indicates that there is a difference between $A_2B_1$ and $A_2B_2$, because the result of the value test obtained from $t_{test} = 14.054$ and $31.137 > t_{table} = 2.021$ for n = 36. The result confirms that there is a difference, meaning that $H_o$ is rejected. The mean score of

introvert students who used clustering technique was lower than extrovert students. Consequently, learning by clustering technique for extrovert students is better than for introvert students.

Moreover, the fourth hypothesis proved that there is a difference of mean score between crossword puzzle game and clustering technique of introvert students. The mean score of introvert students who used crossword puzzle game was 53.22 and 57.75 for clustering technique. It also demonstrates that there is a difference between $A_1B_1$ and $A_2B_1$, because the result of the test value obtained was $t_{test} = 13.757$ and $14.054 > t_{table} = 2.021$ for n = 36. The result confirms that there is a difference, meaning that $H_o$ is rejected. The mean score of introvert students who used crossword puzzle game was lower than clustering technique. Consequently, learning by clustering technique for introvert students is better than crossword puzzle game.

Again, in the fifth hypothesis, it showed that there is a difference of mean score between crossword puzzle game and clustering technique of extrovert students. The mean score of extrovert students who used crossword puzzle game was 58.44 and 59.39 for clustering technique. It also demonstrates that there is a difference between $A_1B_2$ and $A_2B_2$, because the result of the test value obtained was $t_{test} = 26.135$ and $31.137 > t_{table} = 2.021$ for n = 36. The result confirms that there is a difference, meaning that $H_o$ is rejected. The mean score of extrovert students who used crossword puzzle game was lower than clustering

technique. Consequently, learning by clustering technique for extrovert students is better than crossword puzzle game.

## DISCUSSION

The result of the first hypothesis testing illustrated that there was an interaction between the techniques and the personalities in students' vocabulary size. Hatch and Lazaration (1991:381) affirm that it is not always the case that the figure for the interaction will form a crossover pattern. Even though there is no crossover, the effect of the techniques is still clearly due to better performance of extrovert in the clustering technique. The difference in the techniques for extrovert appears trivial. As stated by Hatch and Lazaration (1991:370) that, for example, there is no interaction where, say, males in the cooperative learning group do better than females and that females do better than males in the teacher-center class. Therefore, if there were an interaction, it would weaken the argument in favor of one of the techniques.

The finding was not similar to the research conducted by Babayemi and Akinsola (2014:8), which examined the effects of crossword-picture puzzle (CPP) and mental ability on students' achievement in Basic Science. It showed that the treatment had significant main effect on achievement ($F_{(2,389)} = 202.16$; $p < 0.05$; $\eta^2 = .52$). Mental ability had significant main effect on achievement ($F_{(2, 389)} = 5.04$; $p < 0.05$; $\eta^2 = .03$). There was no significant two-way interaction effect of treatment and mental ability on achievement ($F_{(4,389)} = 1.630$; $p > .05$; $\eta^2 = .017$). Crossword picture puzzle strategy is therefore, recommended to be adopted by Basic Science teachers and curriculum planners.

The result of the second hypothesis in this research explained that there was a difference between introvert and extrovert students who used crossword puzzle game in their vocabulary size. It is sustained by Jaramillo, et al's research (2012:213), that crossword puzzle employed several useful student skills including vocabulary, reasoning, and spelling. They evaluated that this with case studies accompanied by results revealing the suitability of the exercise for undergraduate students. These findings showed that students perceive themselves to be better equipped to handle concepts as a result of this crossword puzzle exercise. In this research, the result of the value test was $t_{ratio} = 13.757$ and $26.135 > t_{table} = 2.021$ for n=36. The result indicated that there was a difference, meaning that the $H_o$ was rejected. The mean score of extrovert students who used crossword puzzle game was higher than introvert students. In other words, learning by crossword puzzle game in extrovert students is better than introvert students. It proved that this class (X MIA 3) has a higher score for extrovert students than introvert students. It indicated that extrovert students had positive effect in their score if they used crossword puzzle game based on the data. In addition, the score of both introvert and extrovert students' scores increased. As a matter of fact, the difference was only in their score, which the extroverts had higher score than introverts.

The learning process through clustering technique demonstrated that there was a different score in introvert and extrovert students. Khalilisabet (2015:209) conducted research that the finding of the study organizing vocabulary was a facilitative method to achieve it more successfully. In the study, both semantic and thematic clustering proved to be effective for the learners at intermediate level. Therefore, using these methods can increase the learners' ability to acquire and learn. For the goal of language learning, it is a good idea that English dictionaries be devised by experts based on vocabulary categorization.

In line with the third hypothesis, extrovert students had a better score than introvert students. The result of the value test obtained from $t_{test}$ = 14.054 and 31.137 > $t_{table}$ = 2.021 for n = 36. The result confirmed that there was a difference, meaning that $H_o$ was rejected. The mean score of introvert students who used clustering technique was lower than extrovert students. Consequently, learning by clustering technique for extrovert students is better than for introvert students. It is clearly seen that introvert and extrovert students had different score in clustering technique, but, extrovert had positive effect in their vocabulary size. It indicated that extrovert students had positive effect in their score if they used clustering technique based on the data. In addition, the score of both introvert and extrovert students increased. As a matter of fact, the difference was only in their score, which the extroverts had higher score than introverts. This is similar to Ashraf and Khosravani's finding (2014:44), who investigated the impact of L2 vocabularies semantic clustering on critical thinking and permanent vocabulary learning of Iranian EFL young learners. After analyzing the statistical results, there was significant evidence that the semantic clustering of L2 vocabularies were effective in improving the level of critical thinking and vocabulary learning of Iranian EFL young learners. It means that presenting semantic relationships and word associations can be facilitative in teaching vocabulary and are worth developing.

For the fourth hypothesis testing, it verified that crossword puzzle game and clustering technique for introvert students had different score. But, their vocabulary size increased through both techniques. As supported by Jaramillo, et al (2012:217), both new and more experienced students enjoyed the exercise of crossword puzzle and found it useful for their learning. Also, students' answers to the open-ended questions showed that they felt more confident in their own ability when they rightly identified answers. They were also able to cite their weak areas, while finding the exercise to be a fun learning experience. In some cases they stated that the activity was innovative, different, useful, and a fun opportunity to evaluate their own level of learning by identifying concepts that were previously unknown or unclear. It allowed them to confirm the status of their understanding and determine where they had deficiencies in their potential knowledge.

The result of the last hypothesis was evidence that using crossword puzzle game and clustering technique for extrovert students had different score. But, both of their vocabulary size increased through both techniques. As suggested by Orawiwatnakul's study (2013:415), learning vocabulary through crosswords was one of the best ways to improve students' vocabulary. The findings assured students' retention in memorizing vocabulary they gained from the activity provided. The results revealed that in the scores of the three vocabulary tests, there were significant differences at the 0.05 level. That was, the scores from the first vocabulary test were different from those of the second time and the third time. Especially, a statistically significant difference between the second time and the third time demonstrated that students had better vocabulary retention after learning with this tool. It might be because the students studied vocabulary in enjoyable learning environments. In this fun and recreation, they gained knowledge at the same time. Consequently, learning by clustering technique for extrovert students is better than crossword puzzle game. The students who had extrovert personality had positive effect in their vocabulary size. Those two techniques were good to be implemented to extrovert students since the data showed that the extrovert students in both techniques had increased their vocabulary size from the pre test to the post test.

**CONCLUSIONS**
Based on the findings of the data analysis, some conclusions could be drawn that there was an interaction between techniques and personality in students' vocabulary size at the first grade of SMAN 1 Purbolinggo. It means that there is an effect of both techniques on personality in students' vocabulary size. Since extrovert students were very suitable with both techniques (crossword puzzle game and clustering technique), introvert students could not be considered that they were not good at both techniques. Given that introvert students' vocabulary size increased through both techniques, they were also suitable with both techniques. It points out that it could not be concluded that extrovert is appropriate in crossword puzzle game, and introvert is appropriate in clustering technique and vice versa. Actually, if there were an interaction, in fact, it would weaken the argument in favor of one of the techniques. But, the introvert and extrovert students' vocabulary size increased through both techniques. In this case, the interpretation would be that the $H_o$ of no difference between the two techniques could be rejected. The techniques differed significantly with the students performing better in clustering technique. The $H_o$ of no difference for personality could also be rejected. Extroverts did better than introverts regardless of the techniques. Therefore, the crossword puzzle game and clustering technique are more useful for extrovert students than introvert students in improving students' vocabulary size.

In addition, there was a different vocabulary size between introvert and extrovert students who used crossword puzzle game (X MIA 3) and clustering technique (X MIA 4). Extroverts in both classes had higher score than introverts. But, it does not

mean that introvert students had negative effect in this technique. Moreover, both introvert and extrovert students' vocabulary size increased, it represents that the two types of personality had positive effect in their score. As a matter of fact, the difference was only in their vocabulary size, which the extroverts had higher vocabulary size than introverts. Consequently, crossword puzzle game and clustering technique is more effective for extrovert students than introvert students.

**SUGGESTIONS**

In accordance with the findings and conclusions, some suggestions are proposed as follows:

1. For English teachers, crossword puzzle game and clustering technique are a part of vocabulary techniques presumed to help students overcome difficulties in increasing their vocabulary size. The teacher should give these techniques to his/her students based on their personality. As the findings showed that extrovert and introvert students' vocabulary increased through both techniques, it is recommended that the teachers should be aware of their personality that introvert and extrovert students are suitable for crossword puzzle game and clustering technique.

2. This research was limited by the use of only two classes, small sample size, and short-time period. The result could not be universalized into all contexts of situation since this result is probably compatible in certain field but not for others. Therefore, further research on vocabulary techniques should try to investigate with randomized subject, bigger sample size in longer-time period in order to get more reliable and valid on the result of the

research. It is also suggested for further research to use more than one instrument such as, qualitative instruments. The researcher recommends further research of vocabulary size to conduct deep investigation on the process of vocabulary learning by adding more than two variables such as learning style, motivation, attitude towards English, and other factors.

**REFERENCES**

Ashraf, H.and Khosravani, M. (2014). Developing Critical Vocabulary Learning via Semantic Clustering. *International Journal of Foreign Language Teaching in the Islamic World, Vol. 2, No. 2, pp. 44-50.*

Babayemi, J.O and Akinsola, M.K. (2014). Effects of Crossword-Picture PuzzleTeaching Strategy and Mental Ability on Students' Achievement in Basic Science in Southwestern Nigeria. *Journal of Research and Method in Education (IOSR-JRME). Volume 4, Issue 4 Ver. III (Jul-Aug. 2014), pp. 08-13.*

Eysenck, H. J. (1981). *A Model for Personality*. New York: Springer-Verlag.

Hatch, E. and Lazaration, A. (1991). *The Research Manual: Design and Statistics for Applied Linguistics.* New York: Newburry House.

Jaramillo, C. M. Z., Losada, B. M., and Fekula, M.J. (2012). Designing and Solving Crossword Puzzles: Examining Efficacy in A Classroom Exercise.

*Developments in Business Simulation and Experiential Learning, volume 39, pp. 213-222.*

KhaliliSabet, M. (2015). The Effect of Vocabulary Cluster on Iranian Intermediate EFL Learners' Vocabulary Achievement. *International Journal of Applied Linguistics and English Literature, Vol. 4 No. 1, pp. 209-215.*

Orawiwatnakul, W. (2013). Crossword Puzzles as a Learning Tool for Vocabulary Development. *Electronic Journal of Research in Educational Psychology, vol. 11, núm. 30, pp. 413-428.*

Oshima, A. and Hogue, A. (1999). *Introduction to Academic Writing*. New York: Addison Wesley Longman.

Richards, J. C. and Renandya. (2002). *Methodology in Language Teaching an Anthology of Current Practice*. New York: Cambridge University press.

Schmitt, N. (2000). *Vocabulary in Language Teaching*. Cambridge: Cambridge University Press.

Serna, I.M. and Ajor, J.F.P. (2011). Active learning: Creating Interactive Crossword Puzzles. *Paper presented at the International Conference on Education and New Learning Technologies. Cartagena: Universidad Politécnica de Cartagena. pp.1731-1738.*

Sutarsyah, C. (2006). Word Definition Matching Format: A Vocabulary Level Test for EFL Learners. *Paper presented at the 51st TEFLIN International Conference. Bandung, Indonesia.*