The Effectiveness of the Online Crossword Puzzle as a Vocabulary Learning Tool for the Tenth Grade Students of Man 2 Palu

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Abstract

The use of crossword puzzles has been widely used in paper-based forms; in this study, the use of crossword puzzles is integrated with digital technology. This form offers more interactive and engaging alternatives than traditional paper-based formats. This research was conducted at MAN 2 Palu. The aim of this research was to find out the effectiveness of the use of online Crossword Puzzles as a tool for learning vocabulary in the tenth-grade students of MAN 2 Palu. This research applied a quantitative method with a quasi-experimental design. There were two classes: Experimental class (XE), which was taught by online Crossword Puzzles, and the control class, which was taught by the conventional method. The total number of students was 35 in each class. The instrument used in this research was a test in the form of multiple choice, translation, matching words and a cloze test. The test was divided into pre-test and post-test to investigate the students' vocabulary mastery in the experimental and control classes before and after treatment. The result of the research showed that the use of online Crossword Puzzles improved students' vocabulary mastery significantly. It can be seen that the result of the T-test (16.370) was higher than the T-table (2.032). Based on the data analysis, it can be confirmed that H_0 is rejected, and H_a is accepted. Thus, it can be concluded that the use of online Crossword Puzzles is effective as a vocabulary learning tool for the tenth-grade students of MAN 2 Palu.

Keywords: Vocabulary Mastery, Crossword Puzzles, Learning Tool.

Abstrak

Penggunaan teka-teki silang telah banyak digunakan dengan berbasis kertas, dalam penelitian ini penggunaan teka-teki silang diintegrasikan dengan teknologi digital. Bentuk ini menawarkan alternatif yang lebih interaktif dan menarik daripada format berbasis kertas tradisional. Penelitian ini dilaksanakan di MAN 2 Palu yang bertujuan untuk mengetahui efektivitas penggunaan *online Crossword Puzzle* sebagai alat pembelajaran kosakata pada kelas sepuluh di MAN 2 Palu. Penelitian ini menerapkan metode kuantitatif dengan desain kuasi eksperimen. Terdapat dua kelas dalam penelitian ini: kelas eksperimen (XE) yang diajar menggunakan *online Crossword Puzzle* dan kelas kontrol yang diajar menggunakan metode konvensional. Sampel dalam penelitian ini berjumlah 35 siswa di masing-masing kelas. Instrumen yang digunakan adalah tes dalam bentuk pilihan ganda, penerjemahan, pencocokan kata, dan *cloze test*. Tes dibagi menjadi *pre-test* dan *post-test* untuk mengukur penguasaan kosakata siswa di kelas eksperimen dan kelas kontrol sebelum dan sesudah perlakuan. Hasil penelitian menunjukan bahwa penggunaan *online Crossword Puzzles* secara signifikan meningkatkan penguasaan kosakata siswa. Hal ini terlihat dari uji-t, dimana nilai t-hitung (16.370) lebih tinggi dibandingkan nilai t-tabel (2.032). berdasarkan analisis dari data tersebut, dapat disimpulkan bahwa H_o ditolak dan H_a diterima. Dengan demikian, dapat disimpulkan bahwa penggunaan *online Crossword Puzzle* efektif sebagai alat pembelajaran kosakata bagi siswa kelas sepuluh di MAN 2 Palu.

Kata Kunci: Penguasaan Kosakata, Teka-Teki Silang, Media Pembelajaran.

INTRODUCTION

Vocabulary improvement is one of the important aspects of language learning, especially in the realm of formal education. Having a rich and extensive vocabulary allows students to understand the content of the lessons and express their ideas more effectively, as they are able to construct sentences more accurately. This indicates that developing students' vocabulary is the key to learning a foreign language and is also a

fundamental aspect of using language. Vocabulary is very important to make using a second language easier. Without sufficient vocabulary, it will be difficult to construct meaningful sentences (Wakana, 2018). In other words, without correct vocabulary, it is hard to use the language fluently and clearly.

In Indonesia, English is a foreign language where every component is different from the students' mother tongue. As a result, many students find difficulties in the learning process. This also happens at MAN 2 Palu. Based on the interview with the English teacher, one of the problems faced in teaching English is the lack of students' vocabulary mastery. As a result, students become less interested in learning English; they feel that English is a boring and unimportant subject. Considering this problem, it is needed to ensure that students become interested in learning English. It is because English will be more crucial in the future.

Based on that case, teachers need to teach English more creatively to help students master vocabulary easily. Teachers must implement appropriate strategies to ensure that the media used is effective for students. In this case, the use of media as a tool for teaching vocabulary is important. Learning media are frequently used during the teaching and learning process to support the teacher in achieving active, engaging, and enjoyable learning, especially while teaching vocabulary. In addition, the media can connect the teachers and students during the learning process in the classroom. There are various kinds of strategies that can be used in teaching vocabulary. One of them is by using games.

One of the teaching strategies that motivates students to engage in learning through play is the use of educational games (Gamlo, 2019). Nowadays, games are becoming one of the most popular learning media. As technology advances, there is an increase in fans of digital games in learning (Elizabeth, 2016). Hence, teachers must be able to adapt to technological developments in order to align the learning process with the characteristics of students nowadays. A digital game is a game that is played by using digital media such as smartphones, computers, etc. The use of digital games will not only help teachers create a creative, active, fun and modern learning atmosphere but also make the vocabulary acquisition for the students more effective (Gulkhayo, 2023). Furthermore, educational games are used frequently due to their benefits. This learning method emphasises students' active involvement and contributes to the development of their social skills and teamwork (Derakhshan, 2015).

In this research, the researcher used Online Crossword Puzzles as a learning medium in teaching vocabulary. Crossword puzzles are a kind of word game. It consists of the squares that can be filled by words and numbers or a letter and a number for each square (Adeela, 2023). In Crossword Puzzles, there are two instructions across (horizontal) and down (vertical), and the goal is to fill the squares with the appropriate words or numbers based on the clues given. As time passed, crossword puzzles were not only paper-based but also evolved into digital games.

There was one of the latest research that concerned the effect of crossword puzzles in vocabulary learning, this research shows that from Word Search, Word Wall, Crossword and Scramble Games, Crosswords puzzles have the highest influence value of 1.04% more than word search, word wall, and scramble (Siti, 2024). This indicates that Crossword Puzzle is more effective in learning vocabulary than other puzzle games. The other studies claim that among many teaching approaches, traditional or otherwise, the use of crossword puzzles seems to offer potential and a solution for the problem of learning vocabulary (Orawiwatnakul, 2013). It means that, although there are many different teaching methods used in teaching vocabulary, crossword puzzles stand out as an effective method. Crossword Puzzles are more effective in helping students understand and remember new vocabulary.

Drawing upon the observations and the problems identified, this research aims to find out the effectiveness of the use of online Crossword Puzzles as a tool for learning vocabulary among the tenth-grade students of MAN 2 Palu. This research highlights the importance of developing students' vocabulary ability through the use of online Crossword Puzzle learning media. It is believed to be able to improve vocabulary recall as well as student engagement in the language learning process. The findings of this research are expected to contribute towards the implementation of innovative and interactive vocabulary learning strategies.

METHOD

The study utilised a quantitative method with quasi quasi-experimental design to find out the effectiveness of the use of online Crossword Puzzles as a tool for learning vocabulary among the tenth-grade students of MAN 2 Palu. An experimental design was used to examine whether there are differences in the experimental class, the class that was taught by the online Crossword Puzzles and the control class, the class that was taught by the conventional teaching method. The use of quasi-experimental design due to non randomly assigned participants. The population of this research consists of all tenth-grade students at MAN 2 Palu, which comprises fifteen classes, totalling 520 students. The sample consisted of two classes, each consisting of 35 students. The sampling technique employed was purposive sampling, as they were considered the most suitable for the objectives of this research. These two classes are faster than other classes in receiving the material. Therefore, the researcher chose these two classes as the samples, where class X E is the experimental class and class X F is the control class.

The data were collected through a test. This test is used to measure students' learning outcomes at the cognitive level. The test consisted of multiple choice, translation, matching words and a cloze test, totalling 25 questions based on the three components of vocabulary: word meaning, word use, and word formation (Jeremy Harmer, 2008), which is integrated with the narrative text material. The test is divided into pre-test and post-test to investigate the students' vocabulary mastery in the experimental and control classes before and after treatment. The data obtained from the pre-test and post-test were analysed with SPSS version 27 for Windows in several stages: descriptive statistics to describe and summarise the data (mean, minimum, maximum and standard deviation) before further analysis. A normality test and a homogeneity test are used as an absolute requirement before conducting the T-test. The T-test is used to determine whether a difference between the means of two samples is significant. The researcher used T-test statistics or T-count, which were compared with the T-table to determine the effect of the use of online Crossword Puzzles on students' vocabulary.

RESULTS AND DISCUSSIONS

Result

In this research, the researcher presents the results of the data analysis relating to the effectiveness of the online Crossword Puzzles as a vocabulary learning tool for the tenth-grade students of MAN 2 Palu. The researcher used a quasi-experimental design consisting of the experimental class with the treatment (using online Crossword Puzzles) and the control class without the treatment (using a conventional teaching method). There were two variables in this research: online Crossword Puzzles (X) as the independent variable, and vocabulary ability (Y) as the dependent variable. The researcher used a test to collect the data that consisted of 25 numbers of questions. The calculation of students' scores refers to the scoring criteria shown below;

Table 1: Classification of the Students' Scores

No	Classification	Score
1.	Very Good	85-100
2.	Good	65-84
3.	Fair	55-64
4.	Poor	35-54
5.	Very Poor	0-34

(adapted from Arikunto, 2006)

Students' pre-test and post-test scores were calculated using a predetermined scoring formula, as detailed below:

Table 2: Descriptive Statistics of Students' Grades

	N	Range	Min	Max	Mean	Std.Deviation
Pre-Test E	35	44	32	76	49.49	11.441
Post-Test E	35	48	52	100	79.54	14.018
Pre-Test C	35	52	20	72	46.06	13.898
Post-Test C	35	52	32	84	56.69	13.873

Valid (N) Listwise	35				

Descriptive statistics are used to describe and summarise the data. Descriptive statistics only focus on describing the content of the sample. Based on the table, the mean of the experimental class before and after treatment showed a significant improvement from a poor classification (49.49) to a good classification (79.54). Meanwhile, the control class only showed a slight improvement from poor classification (46.06) to fair classification (56.69).

The total sample used was 70 students, which means the analysis procedures of the normality test were carried out with Kolmogorov-Smirnov using a level of 0.05. The data of the normality test was displayed in the following table:

Table 2 Normality Test

		Kolmogorov Smirnov		
	Class	**Statistic**	**Df**	**Sig.**
Result	Pre-Test E	.127	35	.164
	Post-Test E	.115	35	.200[*]
	Pre-Test C	.103	35	.200[*]
	Post-Test C	.134	35	.114

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the normality test results displayed in the table, it showed that the significance value of the experimental class pre-test was obtained as 0.164, and the post-test was 0.200, which is higher than 0.05. Meanwhile, the pre-test of the control class was 0.200, and the post-test of the control class was 0.114, which means both the experimental class and the control class were declared normally distributed.

The decision-making criteria in the homogeneity test were: if the significance value > 0.05, then the variance of two or more groups of population data can be said to be homogeneous.

Table 3 Homogeneity Test

	Class	**Levene Statistic**	**Df 1**	**Df2.**	**Sig.**
Result	Based on the Mean	.044	1	68	.834
	Based on the Median	.061	1	68	.806
	Based on Median and with adjusted df	.061	1	67.029	.806
	Based on the trimmed mean	.062	1	68	.804

Referring to the data, the significant value based on mean is 0.834, which is greater than the predetermined significance level of 0.05, indicating a statistically significant result. It indicates that the data have homogeneous variance.

Based on the results of the normality and homogeneity tests, which show that the data is normally distributed and has a homogeneous variance, the Independent Sample t-test is then conducted to determine whether there is a significant difference between the experimental and control groups, which is displayed in the following table:

Table 4. Independent Sample T-Test

		Levene's Test for Equality of Variances				
		F	**Sig.**	**T**	**Df**	**Sig. (2-tailed)**
Result	Equal variances assumed	.044	.834	6.857	68	.000

	Equal variances not assumed			6.857	67.993	.000

As indicated by the significance value on Levene's Test for Equality of Variances of 0.834 > 0.05. Therefore, the independent sample t-test analysis was conducted assuming that the variances of the two groups were equal (equal variances assumed). The result of the t-test showed that the significance value (2-tailed) is 0.000 < 0.05, which means there is a statistically significant difference between the result of the experimental class taught by Online Crossword Puzzle and the control class taught using conventional methods.

After obtaining the results of the Independent Sample t-test comparing two different groups, a Paired Sample T-test was conducted to determine whether there is a significant difference between the pre-test and post-test results in the experimental class. The result of the Paired sample T-test is shown in the following table:

Table. 5 Paired Sample T-Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Dev	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest Postest	30.057	10.863	1.836	33.789	26.326	16.370	34	.000

Based on the table, the t-count value is 16.370 with a significance value (2-tailed) of 0.000. Since the significance value is smaller than 0.05, H_0 is rejected and H_a is accepted. This shows that there is a significant difference between the results of the pre-test and post-test after the treatment by using online Crossword Puzzles.

Furthermore, hypothesis testing is also strengthened by comparing the t-count value with the t-table value. At a significance level of 0.025 (the result of 0.05 divided by 2) and a degree of freedom (df) of 34, the t-table value is 2.032. Where the t-count value (16.370) is much greater than the t-table value (16.370 > 2.032), it can be confirmed that H_0 is rejected and H_a is accepted. Thus, it can be concluded that the use of online Crossword Puzzles is effective as a vocabulary learning tool for the tenth-grade students of MAN 2 Palu.

Discussions

The aim of this research is to prove the effectiveness of the online Crossword Puzzles as a vocabulary learning tool for the tenth-grade students of MAN 2 Palu. The result of the data showed that the students who received the treatments used online Crossword Puzzles better on the post-test than those who only learned with conventional methods. The T-test results also showed significant differences between the experimental and control classes. It means the online Crossword Puzzle had a positive impact as a vocabulary learning tool for the tenth-grade students of MAN 2 Palu.

Students' improvement in experimental class could be influenced by the benefits provided by online Crossword Puzzles. When students played the game, they were actively involved in the thinking process to find answers to the clues given. This helps them understand the meaning of the vocabulary in a deeper and more fun way, making it easier to remember and reuse in other situations. Craik and Lockhart (1972) state that the deeper the information is processed, the stronger it is stored in long-term memory.

This research was also supported by earlier research conducted by Yustinus (2022), which demonstrated that the implementation of the Crossword Puzzle can enhance the students' vocabulary mastery. The activity of composing words through crossword clues increases brain activation. This helps students learn more actively in the classroom. Baiq Siti et al. (2024) show that, among other word games, crossword puzzles had a higher impact on improving students' vocabulary mastery. Through the process of solving clues and constructing words, students are more likely to retain vocabulary in their long-term memory.

The use of technology-based media also increases student interest because teachers can create an interactive and fun learning atmosphere. Students also feel more interested and motivated to participate in learning because of the challenging and educational games. Gulkhayo (2023) states that the use of digital games will not only help teachers create a creative, active, fun and modern learning atmosphere but also make the vocabulary acquisition for the students more effective. This emphasises that the application of digital game media in the learning process has many positive impacts on teachers and students.

On the other hand, students in the control class who were taught without using online Crossword Puzzles (taught by using conventional teaching methods) only showed a slight improvement. This shows that conventional learning methods are less effective in improving students' learning outcomes compared to methods involving interactive media, such as online Crossword Puzzles.

In conclusion, the online Crossword Puzzle as a vocabulary learning tool shows a positive impact in improving students' vocabulary. This is related to the use of digital media online crossword puzzle games in creating an active, creative and fun learning atmosphere. Based on this, the use of online crossword puzzles makes students enjoy the learning process in class, so that vocabulary learning is more effective.

CLOSING

Conclusion

Based on the findings of this research, it has been proven that the use of online media Crossword Puzzles is really effective as a vocabulary learning tool. This is evident from the T-test result (16.370), which is much higher than the T-table value (2.032). It means that compared to the conventional teaching methods, the use of online Crossword Puzzles is more effective in improving students' vocabulary. The use of online Crossword Puzzles in the classroom can help students understand and remember vocabulary effectively. This will certainly have a much better impact on students' English skills because vocabulary is the foundation of a language.

This discovery is important considering that mastery of English, starting from vocabulary learning, is an important aspect for the younger generation to welcome the golden Indonesia 2045. However, in Indonesia, vocabulary is the underlying thing that makes it difficult to learn English. Therefore, it can be concluded that the use of online crossword puzzles can be one of the media that can help students understand and remember vocabulary more effectively.

Suggestion

Based on the findings of the research, there are several suggestions for teachers, students and future researchers related to the topic.

For the teachers, it is recommended to create a more interesting learning atmosphere by integrating interactive media such as crossword puzzles or other educational games. Teachers can introduce new ways of delivering learning materials to provide English learning in the classroom more varied. For the students, it is better to learn English anywhere, not only in the classroom. Lastly, for future research, it is suggested to analyze more about online Crossword Puzzles in different contexts.

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