

MNEMONICS FOR TEACHING ENGLISH TO INTELLECTUALLY DISABLED STUDENTS: ARE THEY EFFECTIVE?

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Abstract : Since intellectually disabled students have problems with memory, appropriate strategies to increase students' ability to remember and retain information should be implemented such as the use of mnemonics. This study aimed to investigate the usefulness of picture mnemonic strategy in comparison with grouping mnemonic strategy and conventional strategy in English learning for intellectually disabled students. The repeated-measures within-group design in which three interventions were employed in only one group was used in this study. Indonesian students with intellectual disabilities, aged 15-18, having an IQ of 35 - 70 in State Secondary Special School, C class taking English subject were involved as the participants. Based on the Friedman statistics analysis, the results of this study reveal that Asymp. Sig ((2-tailed)) was 0.000 which was less than the significance value (α) 0.05. It implies that the three sets of scores of intellectually disabled students who were instructed through conventional strategy, picture mnemonic strategy, and grouping mnemonic strategy differed significantly. The post hoc comparisons through the Wilcoxon sign-rank test also indicate that conventional strategy was inferior compared to picture mnemonic and grouping mnemonic. However, picture mnemonic strategy was as effective as grouping mnemonic strategy in English learning for intellectually disabled students.

Key words: mnemonic, intellectual disability, English learning

INTRODUCTION

In this current situation, English is the most commonly studied and taught language and has been used to exchange information among speakers of diverse languages. Because of the great significance of English as an international language, in the Indonesian context, English is a compulsory subject for Senior High School and Junior High School students including students in Special Education.

In general, teaching students with disabilities is regarded to be harder and more challenging compared to teaching English to regular students. Cook and Ogden (2002) identified numerous difficulties faced by teachers in addressing students' autistic behaviors in relation to their social and academic demands. Another challenge is when integrating the students into the classroom setting and common class activities Raudelinaity and Steponien (2020). Similarly, when teaching English to non-native English language learners with intellectual disabilities, some problems also appear. The issues occur because of cultural and linguistic differences and the student's characteristics that can become learning barriers.

Shree and Shukla (2016) claim that intellectually disabled students have problems with low motivation, poor memory, passivity, language development, and are easily distracted. The students specifically struggle with recalling what they have studied. These difficulties result in academic underachievement. Moreover, researchers have found that students with disabilities are more likely to have a bad attitude about learning and engage in inappropriate behavior in class (McCaskey, 2015).

Considering the difficulties that intellectually disabled students face in the learning process, teachers should employ an effective technique that can improve students' ability to retrieve and maintain knowledge, such as the use of memory strategies or mnemonics. Memory strategies or mnemonics are techniques that assist students in 'storing' certain information and then 'recalling' it when required (Oxford, 1990). Similarly, according to Bakken (2017) mnemonics are defined as procedures that are systematic for improving memory and helping make information more meaningful. Moreover, he also states that mnemonic instruction is a strategy to assist students with special needs in remembering new information more effectively and easily.

Thompson distinguishes several types of mnemonics (1987). Picture mnemonics and grouping mnemonics are two of them. Picture mnemonic is a type of visual mnemonic classification that uses images or visualizations to create associations with target concepts (Thompson, 1987). By using picture mnemonic, instead of associating the terms with their meaning or translation, the target words are associated (paired) with pictures. Moreover, he clarifies that associating pictures with words in L2 results in a greater retrieval than pairing them with their L1 counterparts (Thompson, 1987). Meanwhile, grouping mnemonic is a type of verbal mnemonic that uses meaning and stories to help students remember using techniques like grouping or semantic organization and story-telling or narrative chains (Lubin & Pulloway, 2016). The concept of using grouping mnemonic is that if the material to be remembered is arranged in some way, people will use it to their advantage. Thompson (1987) mentions that this is because it is easier to keep and remember arranged material from long-term memory.

Previous studies on the use of various types of mnemonics in language learning for regular students have been conducted by a lot of scholars and the results show that mnemonics are useful to improve students' memory, students' performance, and students' motivation (Davoudi & Yousefi, 2016; Fazih et al., 2018; Philips, 2016, and Suzana, 2017). Mnemonic instruction has also been shown to be an effective method for teaching English to students with various types of disabilities (Dakhil & Al Rub, 2017; Lubin & Polloway, 2016, Merrill, 2015).

Despite the fact that many researchers have conducted research on the use of mnemonics for either regular students or students with disabilities, research comparing two types of mnemonics for teaching English to non-native English language learners with disabilities has never been done. This current study aims to investigate the effectiveness of picture mnemonic strategy in comparison to grouping mnemonic strategy and conventional strategy in English learning for Indonesian intellectually disabled students.

RESEARCH METHOD

Design of the Study

This study used repeated measures within-group experimental design. The repeated measures design involves research respondents in one group participating in all research treatments, each controlled by itself (Creswell, 2008). In other words, several different treatments are used, but they are administered to only one group. Therefore, multiple measures or observations are also done between each intervention. The repeated measures within-group design was used in this study because it was not possible to involve more than one group. It

is because there was only one C class available in this State Special School. The following are the steps of the repeated measure within-group experimental design.

Table 1

A Repeated Measures Design (Creswell,2008)

Time →					
Select Participants for Group	Measure or Observation	Experimental Treatment#1	Measure or Observation (post-test 1)	Experimental Treatment#2	Measure or observation (post-test 2)

Research Participants

This study was conducted at a State Special School Purwosari located in Kudus regency, Indonesia. This school is provided for students with various disabilities (visual limitation, hearing limitation, intellectual disability, physical impairment, and autism) from elementary school until senior high school level. The participants of the study were nine mild intellectually disabled students in the eighth grade, C class consisting of 3 females and six males aged 15-18 years old in English subject. C class is a class for students identified as mild intellectually disabled with an IQ of 50-65 and they typically have low memory problems and poor intellectual ability. The number of students in special schools in each class is limited, not like in regular schools.

Data Collection

The data in this study were obtained through an achievement test as the instrument of the study. The test was used to measure the students' understanding of the material that had been discussed using three teaching strategies, they were: conventional strategy, picture mnemonic strategy, and grouping mnemonic strategy.

Before the implementation of picture and grouping mnemonic, the teacher used a conventional strategy in teaching vocabulary to the students. Using that strategy, she presented vocabularies to the students, gave their meaning in the Indonesian language, and asked the students to memorize those words. After the pre-test, the first experimental treatment that was the use of picture mnemonic was implemented. The first experimental treatment (the use of picture mnemonic) was done in six meetings. When using picture mnemonic, the target words are associated (paired) with pictures instead of associating the words with their definition or translation. An outcome measure (post-test1) followed the first experimental treatment. Then, it was continued by implementing the second experimental treatment (the use of grouping mnemonic) in six meetings. In the implementation of grouping mnemonic, the material was organized into categories. For example, when discussing fruits vocabulary, the vocabulary was organized into fruits preceded with vowels (such as apple, orange) and fruits preceded with consonants (such as banana, mango). A second outcome measure (post-test 2) was taken after the second treatment.

The tests were in spoken form (five items) and written form (five items) associated with the topic studied, such as Fruits, Numbers, Foods, and Drinks. The font of the test item was 16 which was different from the normal font so that the students with intellectual disabilities could easily read it. Moreover, to attract the student's attention, the items test was completed by using colorful pictures.

The content validity of the test is confirmed by determining that the objectives of the test are presented in the test items. Moreover, the test measures the content and outcomes of the course using formats familiar to the students (Coombe, 2007). It is also assessed by making experts analyze the content of the test against the specification defining the domain claimed by the instrument. In this study, the special education specialist and the English language teaching expert analyzed and checked the test items. The outcome of the assessment indicates the validity of the achievement test.

Data Analysis

The three sets of scores in this study were analyzed by using descriptive and inferential analysis through Statistical Package for Social Sciences (SPSS) version 22. Because the data were not normally distributed, non-parametric statistics through the Friedman test and Wilcoxon signed rank test was employed for this statistical analysis. The Friedman test is used to evaluate non-parametric data when the independent variable has more than two levels and when individuals are compared to themselves (Turner, 2014). It is often known as a non-parametric alternative to repeated ANOVA steps when the residual standard value of one or more of the variables is not normally distributed. In this analysis, the Friedman test statistics were used to assess whether or not there is a statistically significant difference among the three sets of students' scores in the pre-test, post-test 1, and post-test 2. Moreover, the Post-hoc comparisons through the Wilcoxon signed rank test was implemented to decide which particular score sets differ.

RESULTS AND DISCUSSION

Results of normality test

In this analysis, the Shapiro-Wilk statistic was used to run the normality test for pre-test scores, post-test (1) scores, and post-test (2) scores. Consideration of the use of Shapiro-Wilk was that the size of the sample was small, which is less than 50. The results of the Shapiro-Wilk test can be found in Table 2.

Table 2. Result of Normality Test

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRE-TEST	.368	9	.001	.722	9	.003
POSTTEST 1	.295	9	.023	.724	9	.003
POSTTEST 2	.336	9	.004	.726	9	.003

a. Lilliefors Significance Correction

Table 2 shows that the p-value for the pre-test was 0.003, the p-value for the post-test 1 was 0.003, and the p-value for the post-test2 was also 0.003. They were smaller than the

significance value (α) 0.05. Since these p-values were smaller than the significance value, it can be inferred that the scores were not normally distributed. The results of the normality test, therefore, serve as a basic idea for non-parametric tests to be carried out through the SPSS version 22.

Results of Descriptive Statistics

The English scores of the students were analyzed using descriptive statistics to find out the minimum and maximum scores, mean, and standard deviation. The results of the calculation are described in Table 3.

Table 3. The Descriptive Statistics of Students' English Scores taught by Using Conventional Strategy, Picture Mnemonic, and Grouping Mnemonic Strategy

	N	Mean	Std. Deviation	Minimum	Maximum
Pre-Test	9	76.5556	6.71493	72.00	88.00
Post-Test 1 (Picture Mnemonic)	9	81.5556	10.23610	73.00	95.00
Post-Test 2 (Grouping Mnemonic)	9	80.7222	9.61480	73.00	95.00

The calculation of the descriptive statistics of students' English scores reveals that there was an increase in the pre-test mean score (76.5556) and the mean score after the intervention of picture mnemonic (81.5556) and grouping mnemonic (80.7222). After being taught using picture mnemonic, the mean value of the students' English score was a bit higher than the mean score of grouping mnemonic. However, descriptive statistics cannot be used to conclude that mnemonics improve the student's score. Inferential statistics are used to make such a decision.

Results of Friedman Test Analysis

To assess the effectiveness of three teaching strategies, the English scores of the students in the pre-test, post-test 1, and post-test 2 were compared. Since there were more than two sets of scores that were not normally distributed, the Friedman test was implemented.

The hypotheses in this research include the null hypothesis and the alternative hypothesis. The null hypothesis (H_0) is that there is no significant difference among the three sets of the English scores of the eighth-grade intellectually disabled students at State Special School taught using conventional strategy, picture mnemonic strategy, and that taught by using grouping mnemonic strategy. Meanwhile, the alternative hypothesis (H_a) is that there is a statistically significant difference among the English scores of the eighth intellectually disabled students at Special School taught by using conventional strategy, picture mnemonic strategy and that taught by using grouping mnemonic strategy. The results of the Friedman analysis through SPSS 22 is shown below:

Table 4. The Friedman Test Analysis

N	9
Chi-Square	15.935
Df	2
Asymp. Sig.	.000

The results of the above Friedman test analysis show that Asymp. Sig ((2-tailed)) was 0.000 which was less than the significance value (α) 0.05 or the p-value was below the significance value (0.05) (p-value=0.000<0.05). Since the p-value was smaller than the significance value, the null hypothesis was rejected, and the alternative hypothesis was accepted.

It can be inferred that the difference among English scores of intellectually disabled students taught by using conventional strategy, picture mnemonic strategy, and grouping mnemonic strategy were statistically significant. The Friedman test simply indicates a substantial difference among the rankings of the three score sets: it does not indicate where the significant differences are located (Turner, 2014). As the alternative hypothesis was accepted, subsequent comparisons were made to decide which scores differed from one another. In this case, the non-parametric post hoc comparisons through the Wilcoxon signed-rank test were implemented to decide which particular score sets differ.

Results of Wilcoxon Signed Rank Test

In this study, the Wilcoxon signed-rank test was used to analyze the English scores in pretest and post-test 1, the scores in pretest and post-test 2, and the scores in post-test 1 and post-test 2. The Results of the calculation of the Wilcoxon signed-rank test are expressed in Table 5, Table 6 and Table 7.

Table 5. The Results of Wilcoxon Signed Rank Test of Pre-Test and Post-Test 1

	Post-Test 1 – Pre-Test
Z	-2.680 ^b
Asymp. Sig. (2-tailed)	.007

a. Wilcoxon Signed-Rank Test

b. Based on the negative rank

The Wilcoxon signed-rank calculation in Table 5 shows that the p-value is 0.007 lower than the significance value (α)0.05 (0.007<0.05), which means that the null hypothesis is not accepted. Therefore, the English scores of the intellectually disabled students in the pre-test (taught using conventional strategy) were significantly different compared to the scores in post-test 1 (taught using picture mnemonic). The students' mean score in the implementation of the picture mnemonic strategy was better than the students' average score in applying conventional strategy. According to the Wilcoxon signed-rank test, picture mnemonic strategy was more effective than conventional strategy.

Table 6. The Results of Wilcoxon Signed Rank Test of Pre-Test and Post-Test 2

	Post-Test2 – Pre-Test
Z	-2.670 ^b
Asymp. Sig. (2-tailed)	.008

a. Wilcoxon Signed-Rank Test

b. Based on the negative rank

The Wilcoxon signed-rank test analysis in Table 6 above shows that the p-value reached 0.008, which was lower than the significance value (α) 0.05 ($0.008 < 0.05$), indicating that the null hypothesis is not accepted. This means there is a significant difference between English scores of intellectually disabled students in the pre-test (the use of conventional strategy) and post-test 2 (the use of grouping mnemonic strategy). The students' mean score for grouping mnemonic strategy implementation was higher than that of conventional strategy implementation. Therefore, grouping mnemonic strategy was more effective than conventional strategy.

Table 7. The Results of Wilcoxon Signed Rank Test of Post-Test 1 and Post-Test 2

	Post-Test2 – Post-Test 1
Z	-1.289 ^b
Asymp. Sig. (2-tailed)	.197

a. Wilcoxon Signed-Rank Test

b. Based on the negative rank

The results in Table 6 show, that the p-value reached 0.197 higher than the significance value of 0.05. Since the p-value was higher than the significance value ($p = 0.197 > 0.05$), the null hypothesis is not rejected. These results mean that the English scores of the students in the implementation of picture mnemonic and grouping mnemonic were not significantly different. Accordingly, it can be summarized that picture mnemonic strategy was as effective as grouping mnemonic strategy.

DISCUSSION

The Conventional Strategy vs the Grouping Activity Mnemonic Strategy

Based on the statistical analysis, the results of this study show that there was a significant difference between the English scores of the intellectually disabled students taught by using conventional strategy and the scores of the students taught by using picture mnemonic strategy. The average scores of the intellectually disabled students after experiencing picture mnemonic was higher than the average score of students after experiencing conventional strategy. This means that, as compared to conventional strategy, picture mnemonic was more effective for teaching English, especially vocabulary to intellectually challenged students.

Picture mnemonic helps students with intellectual disabilities memorize vocabulary they have acquired and use it in simple writing and speaking activities in English language learning. One reason for the improvement is that matching pictures with words in L2 promotes greater recall compared to pairing them with their L1 parallels (Thompson, 1987). In addition, by introducing picture mnemonics in English learning with a specific emphasis on spoken and written vocabulary, the meaning of words becomes clear. Moreover, students with intellectual

disabilities are also more interested in learning with colorful pictures. Engaging in learning activities makes students easier to store the material they have learned.

Previous researchers found that pictures were preferable to words as stimuli for foreign language learning (Carpenter & Olson, 2012; Phillip, 2016). Phillip (2016) who examined the impact of picture-word pairing strategy and semantic mapping strategy on second-grade vocabulary comprehension revealed that both strategies helped students learn vocabulary. This finding was also consistent with the finding of a study conducted by Dakhiel and Abu Al Rub (2017) who found that pictured letter mnemonics strategies were successful in learning-related English-language letters among students with learning problems in Saudi Arabia. Pictures and objects can be used not only to give meaning and knowledge but also for the inspiration and interest of students (Amiryousefi & Ketabi, 2011).

The Conventional Strategy vs the Grouping Activity Mnemonic Strategy

The results of this research also revealed a significant difference between the scores of students taught by using conventional strategy and the scores of students taught by using grouping mnemonic strategy. The mean score of the students who were taught by using grouping mnemonic strategy was higher than the mean score of students who did not experience grouping mnemonic strategy. Therefore, the grouping mnemonic was more effective in English learning for students with intellectual disabilities compared to the conventional strategy.

Several reasons contribute to the effectiveness of grouping mnemonics. First of all, classifying vocabulary based on certain categories or sets such as fruit, food, and drink, made it less difficult for intellectually disabled learners to study those words. Learning vocabulary in a set or a list also enables students to create a relationship among these words. Moreover, it is easier to store and recall organized information from long-term memory. Finally, the principle of semantic mapping is the relationship between its origins (Al-Khazaali, 2020). Therefore, as the connection between words is recognized, students remember them more easily.

The findings of this study confirm prior studies' findings that found the effectiveness of grouping mnemonics in helping students to remember vocabulary better by referring to subjects that were thematically related to the fundamental concept (Al-Khazaali, 2020; Morin & Goebel, 2001). Similarly, the findings of the study by Al-Khazaali (2020) also suggested that the utilization of the semantic mapping strategy improved students' ability to remember and describe the vocabulary item more easily.

Picture Mnemonic Strategy Grouping Activity Mnemonic Strategy

The results of the study discovered that there was no significant difference between the scores of picture mnemonic instructed students and the scores of grouping mnemonic instructed students. The mean of the picture mnemonic scores was a bit higher than the mean of the grouping mnemonic scores. The difference, however, was not significant. It can then be inferred that both picture mnemonic and grouping activity mnemonic was effective for teaching English to intellectually disabled students. It is because both mnemonics are considered tools for improving memory, particularly for students who have intellectual problems, as they support students to utilize their cognitive strengths. Moreover, as Wang and Kelly (2013) noted that both mnemonic strategies require the learners to make a correlation between what he/she

already understands and the new item for which this is the fundamental principle of all learning. The implementation of mnemonics has also been encouraged as a medium for aiding students, particularly those who may not fulfill the basic standards for academic achievement, like students with learning difficulties and those with a mild intellectual disability/MID (Lubin & Polloway, 2016).

These findings point to the conclusion that the picture mnemonic and the grouping mnemonic were more successful than the conventional strategy for teaching intellectually disabled students in English learning. It was also reported that picture mnemonic strategy was as effective as grouping mnemonic strategy for teaching English to Indonesian intellectually disabled students.

CONCLUSION

In conclusion, the current study identified a significant difference in the English scores of the eighth-grade students with intellectual disabilities who were taught using the conventional technique, the picture mnemonic strategy, and the grouping mnemonic strategy. The analysis also showed that the conventional strategy was inferior to the picture mnemonic strategy and the grouping mnemonic strategy. However, there is no statistically significant difference between the basic English scores of students exposed to picture mnemonics and the English scores of students who were exposed to grouping mnemonics. It can therefore be concluded that picture mnemonic strategy and grouping mnemonic strategy are equally effective in English learning for intellectually disabled students. Mnemonics that are seen as a way to support memory help intellectually disabled students with cognitive deficits, such as poor learning abilities and memorization problems, better recall the information they have learned.

As this current study focuses only on Indonesian students with intellectual disabilities, it is suggested that more researchers investigate the utility of the mnemonic learning technique for students with other disabilities in learning English as a foreign or second language.

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