The Effect of TPR and Audio-Lingual Method in Teaching Vocabulary Viewed from Students' IQ

Anita Dewi Ekawati[*]

University of Muhammadiyah Prof. DR. HAMKA (UHAMKA), Jakarta, Indonesia

This research aimed to investigate the effect of Total Physical Response (TPR) on elementary school students' English vocabulary mastery with regards to their Intelligence Quotient (IQ). Whether or not there is an interaction between the teaching method and IQ in teaching vocabulary was also investigated in this study. The research was carried out at an elementary school in Central Java, Indonesia. The population was the fifth year students of two classes. Both the experimental and control groups consisted of 40 students. The data were analyzed using multifactor analysis of variance 2 x 2 (ANOVA). Then, it was analyzed using Tukey test. The study reveals that TPR was an effective method for teaching vocabulary in elementary school, and the effectiveness of the method was influenced by the level of students' IQ. The results of the study may become a reference for EFL teachers to apply an effective method to teach English vocabulary to elementary school students. Moreover, EFL teachers need to take into account students' IQ in implementing the teaching method.

Keywords: Total Physical Response (TPR), audio-lingual method, teaching vocabulary, Intelligence Quotient (IQ)

Penelitian ini bertujuan untuk mengetahui efek dari Total Physical Response pada penguasaan kosa kata bahasa Inggris siswa sekolah dasar dengan melihat aspek Kecerdasan (IQ) mereka. Ada atau tidaknya interaksi antara metode mengajar dan IQ dalam mengajar kosakata juga dikaji dalam penelitian ini. Penelitian ini dilakukan di sebuah sekolah dasar di Jawa Tengah, Indonesian. Populasi dalam studi ini adalah siswa tahun kelima dari dua kelas. Grup eksperimen dan control terdiri dari 40 siswa. Metode analisa data yang digunakan adalah analisa varian multifaktor 2 x 2 (ANOVA), kemudian dianalisis dengan menggunakan uji Tukey. Hasil penelitian ini menunjukkan bahwa TPR merupakan metode yang efektif untuk mengajar kosa kata bagi siswa sekolah dasar. Hasil penelitian ini menyarankan kepada guru bahasa Inggris untuk mencoba menerapkan TPR sebagai sebuah metode yang efektif untuk mengajar kosa kata bahasa Inggris. Selain itu, guru juga dapat mempertimbangkan tingkat IQ siswa dalam menerapkan metode mengajar tersebut.

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[*] Corresponding author. Email: anita.dewieka@uhamka.ac.id

INTRODUCTION

In Indonesia, English has been a compulsory subject for all levels of education. In the secondary education, students have to learn four major skills, i.e. listening, speaking, reading and writing. To support those four skills, the language components such as vocabulary, grammar, spelling, and pronunciation, are also taught. Vocabulary, for example, is essential for succesful English learning since without extensive vocabulary, there may be some difficulties in communication (Zhihong, 2000).

To date, the teaching of vocabulary in the Indonesian EFL can be considered 'traditional,' in which translation or list of words are provided to students to be memorized. Consequently, young learners find that learning vocabulary not interesting. Therefore, English teachers need to be creative in designing classroom activities. There are some teaching methods which could be considered fun for young learners since the methods can facilitate one of young learners' characteristics, namely physically active. The methods are, among others, audio-lingual method (ALM) and Total Physical Response (TPR). ALM emerged during the Second World War by adopting behaviorism theory, while TPR appeared in the 60s and 70s. According to Rodgers (2001), in ALM teachers act as a language model and drill leader, while in TPR, teachers have a role as commander and action monitor.

A number of studies on ALM (e.g. Mart, 2013) and TPR (e.g. Hsu & Lin, 2011; Kariuki & Bush, 2008; Neupane, 2008; Pujiningsih, 2007) have been conducted. The TPR studies have shown that this method is beneficial to help students improve their vocabulary. However, no study above was connected to students' intelegence quotient (IQ), especially in the context of elementary school in Indonesia. Therefore, this study attempts to investigate the effect of TPR on elementary school students' vocabulary mastery viewed from their Intelligence Quotient (IQ) with the students being taught using audio-lingual method as the control group. Three research questions are posed in this study: (1) Is TPR more effective than the audio-lingual method in teaching vocabulary? (2) Do the students with high IQ have better vocabulary mastery than those with low IQ? and (3) Is there an interaction between teaching methods and IQ in teaching vocabulary?

METHOD

This research was conducted at a primary state school in the province of Central Java, Indonesia. The fifth graders were chosen as samples. The design of this research was quasi experimental study. The experimental group (class B) was taught using TPR, while the control group (class A) was taught using ALM. Each group was categorized into two different levels of IQ: high and low levels. There were 40 students in each class.

Two instruments were used in this research: vocabulary test and students' IQ document. The vocabulary test was designed by the researcher, while the IQ test was obtained from the first semester which conducted by a psychological institution chosen by the school. The vocabulary test was in multiple choices and oral test. The measurement of validity and reliability of the test was done before treatment. Moreover, the tests of normality and homogeneity were conducted before analyzing the data and revealed that the data were normally distributed and homogenous.

In order to analyze the data, the research used 2 by 2 multifactor analysis of variance, as can be seen in the table below:

Table 1: 2 by 2 multifactor analysis of variance

Teaching Methods (A) IQ (B)	The Total Physical Response (TPR) (A_1)	The Audio-lingual Method (A_2)	Mean
High (B_1)	A_1B_1	A_2B_1	B_1
Low (B_2)	A_1B_2	A_2B_2	B_2
Mean	A_1	A_2	

The design of the research consists of 4 cells:
Independent variable : teaching methods (TPR and ALM).
Dependent variable : vocabulary mastery.
Moderator variable : students' IQ.
Experimental group : the class taught by TPR.
Control group : the class taught by ALM.

The meaning of the table:
A_1B_1: The mean score of vocabulary test of students who have high IQ and taught by using TPR method.
A_2B_1: The mean score of vocabulary test of students who have high IQ and taught by using the audio-lingual method.
A_1B_2: The mean score of vocabulary test of students who have low IQ and taught by using TPR method.
A_2B_2: The mean score of vocabulary test of students who have low IQ and taught by using the audio-lingual method.
A_1: The mean score of vocabulary test of experimental class which is taught by using TPR method.
A_2: The mean score of vocabulary test of control class which is taught by using audio-lingual method.
B_1: The mean score of vocabulary test of students who have high IQ.
B_2: The mean score of vocabulary test of students who have low IQ.

After analyzing the data by ANOVA (Analysis of Variance), the researcher used mean score to know which teaching method was more effective or better to teach vocabulary and which group was better. Tukey test or HSD (Honestly Significant Difference) was done when the result of ANOVA showed that the null hypotheses were rejected. It means each variable had influences. The statistical hypotheses are as follows:

1. The difference in vocabulary mastery between the students who were taught by TPR and those taught by audio-lingual method.

H_{01}: $\mu A_1 = \mu A_2$

$H\alpha_1$: $\mu A_1 > \mu A_2$

H_{01}: There was no significant difference in vocabulary mastery between the students who were taught by TPR and those taught by audio-lingual method.

$H\alpha_1$: The students who were taught by TPR had better vocabulary mastery than the students taught by audio-lingual method.

2. The difference in vocabulary mastery between the students who had high IQ and the students with low IQ.

H_{02}: $\mu B_1 = \mu B_2$

$H\alpha_2$: $\mu B_1 > \mu B_2$

H_{02}: There was no significant difference in vocabulary mastery between the students who had high IQ and the students with low IQ.

$H\alpha_2$: The students who had high IQ had better vocabulary mastery than the students with low IQ.

3. The interaction between teaching methods and students' IQ in teaching vocabulary.

H_{03}: $\mu A = \mu B$

$H\alpha_3$: $\mu A \neq \mu B$

H_{03}: There was no interaction between teaching methods and students' IQ in teaching vocabulary. It means that the effect of IQ level on vocabulary mastery did not depend on teaching methods.

$H\alpha_3$: There was an interaction between teaching methods and students' IQ in teaching vocabulary. It means that the effect of IQ level on vocabulary mastery depended on teaching methods.

Notes:

μ= average of the entire data (total mean)

A= teaching methods

B= students' IQ

A_1= the students taught using TPR

A_2= the students taught using audio-lingual method

B_1= the students with IQ

B_2= the students with low IQ

FINDINGS AND DISCUSSION

Findings

The data of the vocabulary test of the students taught using TPR (A1)

Descriptive analysis of the data A1 shows that the score was 48 up to 88. The mean score was 70.775, with the standard deviation 11.19, the mode 79.875, and the median 73.4. The range was 40, while the class was 6 and the interval of the score was 7.

The data of the vocabulary test of the students who taught using ALM (A2)
Descriptive analysis of the data A2 shows that the score was 52 up to 80. The mean score was 67.75, with the standard deviation 7.49, the mode 72.93, and the median 69.96. The range was 28, while the class was 6, and the interval of the score was 5.

The data of the vocabulary test of the students with high IQ (B1)
Descriptive analysis of the data B1 shows that the score was 52 up to 88. The mean score was 71.95, with the standard deviation 10.11, the mode 77.07, and the median 74. The range was 36, while the class was 7, and the interval of these score was 6.

The data of the vocabulary test of the students with low IQ
Descriptive analysis of the data B2 shows that the score was 48 up to 80. The mean score was 66.7, with the standard deviation 7.71, the mode 63.5, and the median 65.93. The range was 32, while the class was 6, and the interval of these score was 6.

The data of the vocabulary test of the students with high IQ who were taught using TPR (A1B1)
Descriptive analysis of the data A1B1 shows that the score was 72 up to 88. The mean score was 79.7, with the standard deviation 5.1, the mode 79.78, and the median 79.78. The range was 16, while the class was 5 and the interval of the score was 4.

The data of the vocabulary test of the students with high IQ who were taught using ALM method (A2B1)
Descriptive analysis of the data A2B1 shows that the score was 52 up to 80. The mean score was 64.3, with the standard deviation 7.44, the mode 65.5, and the median 64.75. The range was 28, while the class was 5, and the interval of the score was 6.

The data of the vocabulary test of the students with low IQ who were and taught using TPR (A1B2)
Descriptive analysis of the data A1B2 shows that the score was 48 up to 72. The mean score was 60, with the standard deviation 7.16, the mode 68.75, and the median 64.16. The range was 24, while the class was 5 and the interval of the score was 5.

The data of the vocabulary test of the students with low IQ who were taught using ALM (A2B2)
Descriptive analysis of the data A2B2 shows that the score was 60 up to 80. The mean score was 71.9, with the standard deviation 6.41, the mode 76.5, and the median 73.1. The range was 20, while the class was 6 and the interval of the score was 4.

Summary of a 2 by 2 Multifactor Analysis of Variance

Table 2. 2 by 2 Multifactor Analysis of Variance

Source of Variance	SS	df	MS	F_0	$F_{t(0.05)}$
Between columns (Method)	204.8	1	204.8	4.67	3.938
Between rows (IQ)	871.2	1	871.2	19.86	
Columns by rows (Interaction)	2880	1	2880	65.67	
Between groups	3956	3	1318.667		
Within groups	3332.8	76	43.85		
Total	7288.8	79			

Because F_o between columns (4.67) was higher than F_t at the level of significance $\alpha = 0.05$ (3.938), the difference between columns was significant. It can be concluded that teaching methods differed significantly from one another in their effect on the subjects in the experiment. The students' mean score of C_1 (70.9) was higher than the students' mean score of C_2 (67.7), so the students who were taught using TPR were better in vocabulary achievement than those who were taught using ALM. It can therefore be concluded that TPR is more effective than audio-lingual method to teach vocabulary.

Because F_o between rows (19.86) was higher than F_t at the level of significance $\alpha = 0.05$ (3.938), the difference between rows was significant. It can be concluded that the difference between the vocabulary achievements of the students with high IQ and those with low IQ was significant. The students' mean score of R_1 (72.6) was higher than the students' mean score of R_2 (66), so the students with high IQ had better vocabulary achievement than those with low IQ.

Because F_o interaction (65.67) was higher than F_t at the level of significance $\alpha = 0.05$ (3.938), the interaction between columns and rows were significant. It can be concluded that there was interaction effect between the two variables: the teaching methods and the degree of IQ on the students' vocabulary mastery. It means that the effect of teaching methods used on the achievement depends on the subjects' degree of IQ.

Tukey test
After analyzing the variance, the Tukey test was done to test the difference of the mean of each group.

Table 3: Tuckey test

Between Group	n	q_o	$q_{t(0.05)}$	Significancy	Meaning
$A_1 - A_2$	40	3.05	2.86	Significant	$A_1 > A_2$
$B_1 - B_2$	40	6.3	2.86	Significant	$B_1 > B_2$
$A_1B_1 - A_2B_1$	20	10.26	2.95	Significant	$A_1B_1 > A_2B_1$
$A_2B_2 - A_1B_2$	20	5.94	2.95	Significant	$A_2B_2 > A_1B_2$

q_o between columns (A_1 and A_2) was 3.05. The value of q_t for α = 0.05 and n = 40 was 2.86. Because q_o (3.05) was higher than q_t (2.86), TPR differed significantly from ALM method for teaching vocabulary. The mean score of the students who were taught using TPR (70.9) was higher than that those who were taught using ALM (67.7). It can be concluded that TPR was more effective than audio-lingual method for teaching vocabulary. Based on the result of ANOVA ($f_o > f_t$) and the result of Tuckey test ($q_o > q_t$), H_o was rejected, and Hα was accepted.

q_o between rows (B_1 and B_2) was 6.3. The value of q_t for α = 0.05 and n = 40 was 2.86. Because q_o (6.3) was higher than q_t (2.86), the students with high IQ were significantly different from those with low IQ. The mean score of the students with high IQ (72.6) was higher than that those with low IQ (66). It can be concluded that the students with high IQ had better vocabulary achievement than those with low IQ. Based on the result of ANOVA ($f_o > f_t$) and the Tuckey test ($q_o > q_t$), H_o was rejected, while Hα was accepted.

q_o between two cells (A_1B_1 and A_2B_1) was 10.26. The value of q_t for α = 0.05 and n = 20 was 2.95. Because q_o (10.26) was higher than q_t (2.95), TPR differed significantly from ALM for teaching vocabulary for students with IQ. The mean score of students with high IQ who were taught using TPR (80.2) was higher than that of those who were taught using ALM (65). It can be concluded that TPR was more effective than audio-lingual method for teaching vocabulary for students with high IQ. Based on the result of ANOVA ($f_o > f_t$) and the result of Tuckey test ($q_o > q_t$), H_o was rejected, and Hα was accepted.

q_o between two cells ($A_2B_2 - A_1B_2$) was 5.94. The value of q_t for α = 0.05 and n = 20 was 2.95. Because q_o (5.94) was higher than q_t (2.95), audio-lingual method differed significantly from TPR to teach vocabulary for students with high IQ. The mean score of students with low IQ who were taught using ALM (70.4) was higher than that of those who were taught using TPR (61.6). It can be concluded that ALM was more effective than TPR for teaching vocabulary for students with low IQ. Based on the result of ANOVA ($f_o > f_t$) and the result of Tuckey test ($q_o > q_t$), H_o was rejected, and Hα was accepted.

Based on the result of analysis, TPR was more effective than ALM for teaching vocabulary for students with high IQ, and ALM was more effective than TPR for teaching vocabulary for students with IQ. It can therefore be concluded that there was an interaction between the teaching methods and the students' IQ for teaching vocabulary. Based on the result of ANOVA ($f_o > f_t$) and the result of Tuckey test ($q_o > q_t$), H_o was rejected, and Hα was accepted.

Discussion

The results of this study show that TPR was more effective than ALM for teaching vocabulary. TPR is based on the fact that foreign language should be learnt in a similar way as children learn their mother tongue: they only listen to it and do what they are asked for. Therefore, the main skill in TPR is listening with concentration on listening comprehension. Mother tongue is rarely used in lessons. All explanations are done through voice, body language, gestures, and actions. Students can listen to a recording while looking at additional materials that help to understand the meaning from context. TPR is based on the premise that human brain has a biological program from acquiring any natural language in the world, including the sign language of the deaf.

TPR decreases students' stress in using new vocabulary, makes lessons more enjoyable, and encourages students to feel more confident and successful. It is in line with what Larsen-Freeman (2002) suggests that TPR is developed to reduce the stress people feel when studying foreign languages, thereby encouraging students to persist in their study beyond a beginning level of proficiency.

Meanwhile, learning through ALM means forming habits. The method is based on teaching drills of sentence patterns and their pronunciation. The main aim is to create communicative ability of learners in a short time and to make responses habitual and automatic. The only language used during lessons is the target language. Special importance given is pronunciation and memorizing of phrases.

Teachers have the central and leading role. Their work is also very demanding because they need to speak accurately. Except for automatic responses, there is a great effort to produce mistake-free utterances. Language is displayed through conversations, divided into lines that are drilled repetitively. Vocabulary is strictly limited and learned only in context. Hockett (as cited in Kumaravadivelu, 2006) states that the teacher's major task is to drill the basic patterns. Learners "require drill, drill, and more drill, and only enough vocabulary to make such drills possible" (Hockett in Kumaravadivelu, 2006, p. 101-102). During the process of drilling, the learners should be carefully guided through a series of carefully designed exercises, thereby eliminating the possibility for making errors. As the learners are helped to perform the drills, they are supposed to inductively learn the grammatical structure being practiced.

Teaching methods which are used by the teacher in teaching learning process helps the students to achieve their goal. Meanwhile, IQ is an important factor to predict score in the subjects. Kail (2010) says scores on IQ tests predict grades in school and occupational success.

TPR is associated with the idea that we all learn in different media. The memory we use when learning to tie shoelaces or to ride a bicycle is kinesthetic memory or 'muscle memory'. This, of course, is just one of the different 'intelligences' we use when learning a foreign language.

By TPR, students are not taught by their teachers' translation or repetition. The students are taught to be more active to know the meaning from their own movement. Richard and Rodgers (2001) state that TPR is a language teaching method built around the coordination of speech and action; it attempts to teach language through physical (motor) activity. It is also related to the theory of Multiple Intelligences that is introduced by Howard Gardner. One of the nine intelligences that is included in his theory is bodily-kinesthetic intelligence, which involves the use of fine and motor skills to solve problems and to perform a sequence of

movements. As TPR involves getting children to move a lot, it enhances their motivation. In terms of language teaching, teachers basically depend on commands when following TPR.

This study reveals that there was a correlation between intelligence and vocabulary achievement; the students having high intelligence had better vocabulary achievement than those with low intelligence. Researchers have also shown that vocabulary and intelligence are highly correlated. Anderson and Freebody (as cited in Marzano, 2004) state the strong relationship between vocabulary and general intelligence is one of the most robust findings in the history of intelligence testing. The students with high IQ will have better access to the brain in processing and storing information needed regarding their vocabulary. The ability to process and store information is a component of what cognitive psychologists refer to as fluid intelligence. Cattell (as cited in Marzano, 2004) states fluid intelligence is innate. One of its defining features is the ability to process information and store it in permanent memory. High fluid intelligence is associated with enhanced ability to process and store information. Low fluid intelligence is associated with diminished ability to process and store information.

The students with high intelligence retain most the vocabulary experiences as a new knowledge and store them in their memory, meanwhile for those having low intelligence will not. By doing so, the high IQ students and their vocabulary mastery grow all the times when they are faced with a new one. The students with low IQ do not participate totally in the learning process given by the teacher. They show lack of interest and little attention. They prefer to become the audience or listener in the learning process because it takes time to capture and store the new words. They also need more time on how or when to use those new words in their activity because it is quite difficult for them to understand the new material or word which is needed in the vocabulary achievement. Some have trouble relating to or communicating with their peers because of disparities in vocabulary size (especially in the early years), personality, interests, and motivation. Lahey (2009) argues that a child with low intelligence will often seem less competent than an average younger child with the same mental age.

Another finding in this study shows that there is an interaction between teaching methods and the students' intelligence for teaching vocabulary. The high IQ students have better understanding about the learning material which is proposed in the TPR. They can work cooperatively with other students, and they are very active in doing the instruction given by the teacher. They tend to have more initiative and be confident in doing something without waiting further command from the teacher. They tend to fix their mistakes and will avoid them to happen again. Christison (as cited in Richard & Rodgers, 2001) states that the more awareness the students have of their own intelligences and how they work, the more they will know how to use that intelligence to access the necessary information and knowledge from a lesson.

Based on the explanation above, it can be concluded that TPR is more effective for students having high intelligence for teaching vocabulary. Meanwhile, ALM cannot motivate the students because the main focus of this method is the teacher. It is a teacher-centered lesson in which the teacher or the audio material is the model. Margolis (as cited in Abu-Melhim, 2009) points out that ALM approach results in "a lack of student motivation" (p. 43), arising in large part from "pattern drills" that has a tendency to be boring.

Drills, as part of ALM, have been applied to the teaching of English. In this case, teaching English as a foreign language makes teachers and students try to use English as a means of communication. Students having low intelligence tend to wait for some instruction from the teacher on what to do in the class. They also tend to have no curiosity in teaching and

learning process and keep silent even though they do not understand the lesson. ALM seems to be able to satisfy the students having low intelligence. In the ALM class, the students' focus is following orders from their teacher or the material such as tape and video by doing some drills. It can be concluded that ALM method is more effective to teach vocabulary for the students having low intelligence. This conclusion is in line with Kulhavy (1992, p.342) who states that "the academic performance of low-IQ children can be enhanced when instruction is conducted (1) in a domain for which they have substantial knowledge or (2) in a manner whereby the child's knowledge is built step by step" (p. 342).

CONCLUSIONS

The findings show that TPR is an effective method for teaching vocabulary in elementary school, and the effectiveness of the method is influenced by the level of the students' IQ. The result of the research proves that TPR is more effective than ALM to teach vocabulary. TPR brings a good atmosphere in the classroom activity. In TPR, the role of teacher is a model and commander. The teacher teaches vocabulary by saying and practicing the vocabulary with his/her gesture or body movement. First, the students only watch and hear the teacher. Second, the teacher asks the students to follow the gesture or body movement and say the words. Third, the teacher asks the students to practice the vocabulary unaccompanied by the teacher to know whether the students can catch the meaning of the vocabulary. After that, the teacher gives unconscious individual vocabulary test by asking the students to give commands to each other, while the teacher monitors the activity. In TPR, the students grasp the meaning indirectly through movement. The students probably enjoy it. It attracts the students' attention and helps them memorize the words easily. Since the result of the research also proves that there is an interaction between teaching methods and students' IQ, teachers should know the level of students' IQ before applying a teaching method. Finally, teachers need to consider implementing both methods appropriately since there are students with high and low IQ in each class.

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