

Developing Cognitive Ability and Vocabulary Among EFL Students Using Reading Comprehension Techniques

Soon-Ae Song

Ph. D Student, Department of Culture and Arts Contents, Dongbang Culture University, Seongbuk-ro 28 road 60, Seongbuk-gu, Seoul 02838 Korea

lbtssa@hanmail.net

ABSTRACT

This research intends to determine the significant impact of using cognitive tactics in place of conventional ways on vocabulary and reading as a transition for the current high school institutions. The present investigation set out to interrogate the effects of utilising cognitive approaches on reading and vocabulary learning accomplishment over gender in order to spark the attention of cooperating instructors who are unaware of distinctions between male and female potential. The Nelson Proficiency Test was used to homogenize 50 male and female subjects from a total of 87 intermediate respondents into four classes with 25 experimental and 25 control groups. While the control groups experienced standard training based on their handbook, the experimental groups followed the instructions about each of the cognitive learning methods (summarising, note-taking, and rereading). The Wilcoxon performed on the acquired values disproved the study's null hypothesis, which claimed that cognitive methods had no bearing on EFL learners' vocabulary and reading comprehension and that there is no gender disparity. The findings suggest that the investigators found it useful to investigate how cognitive methods can bridge the gap between vocabulary and reading comprehension.

Keywords: EFL learners, Cognitive strategies, Vocabulary reading

1. INTRODUCTION

Approaches present fascinating chances to expand the learning options available to students. Learners must use language learning techniques to improve their vocabulary and reading comprehension. Employing methods helps students overcome the stress that hinders their ability to comprehend text and terminology (Sua, 2021).

It is not overstated to suggest that varied approaches and unified education are essential for student incorporation and academic advancement: "It is the role of the expert to spark students' attention in the curriculum and encourage them to master diverse approaches. Learning vocabulary and reading go hand in hand. They can be taught for a variety of purposes (Suprayogi et al, 2017).

The goal of this study is to determine whether or not cognitive techniques can help EFL learners improve their reading comprehension skills and vocabulary learning in Omanis intermediate (Khajavi & Ketabi, 2012). Additionally, the present study seeks to determine whether or not there are any notable differences among Omanis intermediate EFL learners in terms of supporting vocabulary learning and reading comprehension.

This research presents the findings that try to comprehend how cognitive strategies can enhance students' vocabulary and reading comprehension skills regardless of gender (Zhang et al, 2017). The progress of EFL learners depends on their ability to absorb cognitive methods, hence the main goal of this research is to look into how learners can improve their reading comprehension and internalise their vocabulary. This research also examines whether or not there are any notable differences among Omanis male and female intermediate EFL learners in terms of their capacity to promote comprehension and their vocabulary development.

In this research, we will compare the traditional methods of conventional instruction (C I) focused on the exercises in their normal handbook to the pedagogical efficiency of cognitive strategies on learning

comprehension and vocabulary beyond gender (Nasri & Biria, 2017). According to cognitive methods, studying a language is a worthwhile procedure in which pupils apply their cognitive abilities to acquire the language's laws.

The following research questions were put out in order to fulfil the research's objectives:

Q1: Does the application of cognitive methods help intermediate EFL students improve their capacity for reading comprehension?

Q2: Do male and female intermediate EFL students differ significantly from one another in terms of their capacity to promote reading comprehension?

Q3: Does the employment of cognitive methods affect the vocabulary reading of intermediate EFL learners in any way?

Addressing the questions above, the subsequent null hypotheses were developed:

Ho1: The use of cognitive methods has no impact on the promotion of reading comprehension in intermediate EFL learners.

Ho2: Considering their abilities to promote reading comprehension, intermediate EFL students who are male and female do not differ much from one another.

Ho3: Cognitive methods have no impact on how well EFL students absorb language.

2. LITERATURE REVIEW

Abdelhalim (2017) In this research, EFL students at a KSA university's reading comprehension and reading interaction are developed through the use of a suggested pedagogical technique based on behaviours of mind and cooperative curiosity. The inclusion of two key mechanisms reading comprehension test and interaction survey—was essential to the research. While the control group concentrated primarily on improving basic reading comprehension skills, the experimental group got reading strategy and interaction training exercises in addition to basic reading practice. T-tests were performed on the data, which had been coded according to a variety of indicators of reading interaction and abilities such as literal, inferential, and analytical reading. The findings show that while the CG made modest progress in reading comprehension after the intervention, the EG made greater strides in both learning comprehension abilities and involvement. Results thus demonstrated support for the suggested technique (Drożdżyk, 2012; Zanjare et al., 2023; Gayal et al., 2022; Rolla, 2023).

Obdalova (2014) In this study, using the conceptual framework of the cognitive perspective, we present findings related to EFL teaching study at the university. We demonstrate how a teaching approach that integrates cognitive and communication skills can close language and subject-matter knowledge gaps discovered in a latest study of non-lingual students. We then give an example case study from Tomsk State University, which recommends a teaching strategy that focuses on the improvement of learners' communication and cognitive abilities. Lastly, we make some suggestions for more studies combining teaching with cognitive linguistics (Wihardjo et al., 2024; Vainshnav & Dave, 2022).

Hunt & Beglar (2005) In order to hasten lexical growth, it is suggested that EFL teachers and administrators employ a structured methodology in this article's thorough assessment and evaluation of L2 reading vocabulary study. This model integrates two methods: boosting apparent lexical learning and teaching methods; and fostering the usage of intuitive lexical learning and teaching methods. Understanding decontextualized lexis, employing dictionaries, and implying from context are the three most important direct lexical instruction and learning methodologies. This approach places a strong emphasis on extensive reading because it is unquestionably the most efficient way for EFL students to develop their reading vocabulary to an intense level (Taboada & Rutherford, 2011). Indirect lexical instruction and learning can take many different forms, such as the incorporation of embedded task sets and constricted reading (Kuzin, 2024).

Wilawan (2012) The major objective of this paper is to enhance the major concept comprehension of EFL readers through the integrated application of cognitive and metacognitive processes. EFL students require help strengthening both sorts of reading techniques in order to be proficient and more productive in determining the text's main idea. Based on prior studies, this paper makes the case that EFL students frequently require special assistance in terms of knowledge and abilities in the fundamental concepts of text comprehension at the bottom level for the task of developing primary ideas. Significantly greater cognitive functions and metacognitive techniques are equally important. At each level of operation, the paper suggests some potential principles for teaching major idea understanding. It is also advised to make certain adjustments to teaching methods to better meet the demands of EFL readers.

RESEARCH METHODOLOGY

3.1 Population and Sampling

The goal of the current research was to resolve the effects of cognitive approaches on Omanis high school EFL students' vocabulary and reading comprehension in connection to their genders at Sanofer high school and KSH institutions in Oman. 32 female and 18 male students from a total of 87 subjects who were in the intermediate level and between the ages of 14 and 16 according to the high school ageing criteria made up the respondents. Nearly all of the students have some background in studying English at various private English-language schools. The learners have little experience with cognitive techniques or other relevant concepts. By using the Nelson Proficiency Test, the researcher ensured the subjects' homogeneity (NPT). Of the 50 homogenised respondents, 25 experimental groups and 25 control groups were randomly allocated into 32 girls and 18 males.

The sample has a higher chance of being representative of the whole. Since the research used convenient sampling, the researcher chose the respondents based on the availability sampling process.

3.2 Instrumentations

Two distinct devices were utilised in this investigation to gather the necessary data. The first consisted of 40 questions from the Nelson Proficiency Test (NPT), and the second was a 20-question test created by the researcher that was given as a pre-and post-test.

To evaluate the entry behaviour of the respondents with regards to the variables of this research, which are the vocabulary and reading comprehension test regarding the three cognitive approaches, the procedure involved giving the pre-validated vocabulary and reading comprehension test to both control and experimental groups.

3.3 Data Collection and Procedure

The gathering of data for this project began in July 2018. There were eight sessions, each lasting roughly 45 minutes, and they all took place in the pupils' classroom. The course, which lasted three months, included three lessons from Pre-University English Book 4. Every week, the investigator had two sessions to gather data.

3.4 Design

This analysis may be a control group design, pretest-posttest quasi-experimental analysis. The research's respondents were conveniently divided into experimental and control groups.

3.5 Statistical Analysis

Descriptive and inferential statistics were used in this research's statistical analysis. The respondent's pre and post-test scores were evaluated using descriptive analysis to determine the mean and standard deviation. The Shapiro-Wilk and Mann-Whitney U test methods were used to determine the normality of the pre and post-test in order to determine the test's internal consistency. The investigator invited three applied linguistics professors to review the test's validity by determining whether the test's items would accurately represent the idea being measured. Before the therapy, the grade of variance of the two major categories is compared using one Levene's test. The investigator could affirm that the two major groups

were homogeneous by employing a sample t-test. The average score of four classes prior to treatment was then compared using one T-test. The investigator used SPSS version 18 software to apply Wilcoxon in regard to evaluating the study's null hypothesis.

3. RESULTS

4.1 Result of the Nelson Test Used as the Homogeneity Test

The Nelson language proficiency test (PET) was given to 87 students with the goal to equalise the two groups' respondents' general English language proficiency. The researcher utilised a sample t-test to examine the homogeneity of the classes. Table 4.1 shows the outcome of the descriptive analysis for the Nelson test. The number of participants and the standard deviation are shown in the table below the mean scores.

Table 4.1 The Descriptive Statistics of the Nelson Scores

<i>N</i>	Valid = 87 Missing = 0
Mean	28.47764
Std. deviation	5.3241
Variance	39.4201
Minimum	21.32
Maximum	49.41

50 of the 87 respondents (28.47+/- 5.32) were regarded as homogeneous members, representing one standard deviation and mean. On the basis of odd and even numbers, the homogenised respondents were divided into two groups: control and experimental (N=25).

Table 4.2 Results of the T-Test Comparing the control and Experimental Groups

		F	Sig.	T	df	Sig. (2-tailed)	Mean difference	Std.Error difference
<i>Homogenized</i>	Equal variances assumed	.074	.764	.238	57	.794	.21407	.68409
	Equal variances not assumed			.238	56.329	.794	.21407	.68409

According to the data above, there is a mean difference of .21407 and a standard error difference of .68409. The table demonstrates that the equal variance hypothesis is accepted because the sig. is .794, which is higher than $\alpha = .05$. The experimental and control groups' levels of language proficiency were similar, as shown in Table 4.2 above ($t_{238, df(57)} = .794$ sig., $p > .05$).

Table 4.3 Result of Normality Test Comparing the Control and Experimental Groups

	Group_Con_Exp	Shapiro - Wilk		
		Statistic	df	Sig.
<i>Homogenized</i>	Control	.872	25	.791
	Experimental	.854	25	.544

Table 4.3 above (the Shapiro-Wilk test) shows that the data are normally distributed for the two sets of scores ($P > .05$), which indicates that p is more than .05. For comparability, the independent t-test was utilised. Following homogenization, the descriptive statistics for the two groups are shown below.

4.2 Testing of the First Research Hypothesis

The mean scores of the two groups differed significantly, as shown in Table 4.4 below ($U = 19.42$, $P < .05$). The investigator can therefore confidently deny the null hypothesis. The investigator may definitely deny

the first null hypothesis, which states that adopting cognitive methods has no statistically significant influence on EFL learners' capacity to comprehend prompting reading because the observed sig. 00 is below than the p value.

Table 4.4 The Result of the Mann-Whitney U Test Comparing the Reading Scores of the Control and Experimental Groups

	Scores reading
Mann Whitney U	19.423
Wilcoxon W	647.056
Z	-5.789
Asymp. Sig. (2 – tailed)	.00

In Table 4.5 Shapiro-Wilk test of normality result reveals that the control group's data are not normally distributed ($P < .05$). Thus, the Mann-Whitney U test would be the proper test for mean comparison. The following table displays the descriptive data for the two groups.

Table 4.5 The Test of Normality for the Reading Gain Scores of the Two Groups

	Shapiro - Wilk		
	Statistic	df	Sig.
Con_Gain_Reading	.638	25	.00
Exp_Gain_Reading	.847	25	.321

4.3 Testing of the Second Research Hypothesis

The mean scores of males and females did not significantly differ, according to Table 4.6 below ($U=109.45$, $P>.05$). The investigator thus agrees with the null hypothesis. The researcher can securely admit the second null hypothesis, which states that there is no important disparity among EFL learners pertaining their promoting reading comprehension skill because the achieved sig. 784 is greater than p.value (.05).

Table 4.6 The Result of the Mann-Whitney U Test Comparing the Reading Scores of Males and Females

	Scores reading
Mann Whitney U	109.458
Wilcoxon W	216.458
Z	-.241
Asymp. Sig. (2-tailed)	.772
Exact Sig. [2*(1-tailed Sig.)]	.784 ^b

The results of the Shapiro-Wilk test for normality reveal that the two sets of scores' data are not normally distributed ($P < .05$). Thus, the Mann-Whitney U test would be the proper test for mean comparison. The following table 4.7 displays the descriptive data for the two groups.

Table 4.7 The Result of Normality Test Comparing the Reading Scores of Males and Females

	Gender	Shapiro - Wilk		
		Statistic	df	Sig.
Scores reading	Male	.691	20	.005
	Female	.780	25	.002

4.4 Testing of the Third Research Hypothesis

According to Table 4.8 below, there were significant differences among the two groups' average vocabulary learning scores, $U= 119.50$, $P<.05$. The third null hypothesis is thus securely rejected by the investigator. The researcher may definitely abandon the null hypothesis, which states that applying cognitive techniques has no statistically significant effect on EFL learners' vocabulary development, as the observed sig.000 is smaller than the observed p.value (.05).

Table 4.8 The Result of the Mann-Whitney U Test Comparing the Vocabulary Scores of Experimental and control Groups

	Scores reading
Mann-Whitney U	121.418
Wilcoxon W	563.890
Z	-6.801
Asymp. Sig. (2-tailed)	.00
a. Grouping Variable: Group_1_2	

In Table 4.9 Shapiro-Wilk normality test result reveals that the control group's data are not normally distributed ($P < .05$). Thus, the Mann-Whitney U test would be the proper test for mean comparison. The following table displays the descriptive data for the two groups.

Table 4.9 The Test of Normality for the Vocabulary Gain Scores of the Two Groups

	Shapiro - Wilk		
	Statistic	df	Sig.
Con_Gain_Vocab	.729	25	.00
Exp_Gain_Vocab	.864	25	.053

4. DISCUSSION

The reading comprehension and vocabulary accomplishment post-test dependent variables showed a statistically important disparity among the experimental and control groups according to the findings of the parametric t-test that was utilized to assess the data used in this research. It showed that pre-university students at the intermediate level of English can improve their EFL reading comprehension and vocabulary accomplishment by using the aforementioned tactics.

More specifically, the current study demonstrated that the performance of males and females in experimental groups was distinct from that of the control groups. Comparing these differences to control group differences, they were much more significant. The use of summarising, taking notes, and rereading methods varied significantly across experimental and control groups. Furthermore, post-test results showed that experimental groups' means were greater than those of control groups. In other words, experimental groups outperformed control groups when it came to applying cognitive techniques.

In general, the obtained scores by test-takers in both groups must satisfy the requirement of normality in order for the parametric t-test, which was employed to evaluate the data of the present study, to be valid. The Wilcoxon test must be done as a nonparametric test since the significance value must be more than .05. If it is lower than .05, the requirement of normality is violated. Evidently, parametric tests have higher levels of validity than nonparametric ones. For the participants' pre-test reading comprehension and vocabulary scores, the significant value on the Shapiro-Wilk test of normality was 0.00, which is less than .05. The Mann-Whitney U test would be the proper test for mean comparison because the normality result indicates that the data are not normally distributed for the control group ($p < .05$). There was a significant difference between the mean scores of the two groups, $U = 19.42$, $P < .05$. This was determined by the Mann-Whitney U test, which was used to contrast the reading scores of the experimental and control groups. As a result, the null hypothesis, which claimed that cognitive methods had no effect on enhancing comprehension ability, is safely rejected by the researcher.

The Mann-Whitney U test result for the comparison of the reading scores for men and women in the following phase disclosed that there was no statistically important disparity in the average scores for men and women, $U = 109.45$, $P > .05$. As a result, the researcher adopts the null hypothesis, which suggested that there is no difference in the use of cognitive processes for reading comprehension between males and girls.

The third phase's Mann-Whitney U test result comparing the vocabulary scores of the control and

experimental groups reveals that there was an important disparity among the two groups' mean vocabulary scores, $U = 121.41$, $P < .05$. The investigator may therefore confidently abandon the null hypothesis, which claimed that employing cognitive methods has no appreciable impact on vocabulary learning.

5. CONCLUSION

Numerous inferences can be made as a result of the examination of the data and the discussion of the results. It can be inferred that using the cognitive strategy approach resulted in the development of L2 reading comprehension and vocabulary knowledge based on the impacts of cognitive strategies on learners' L2 reading comprehension and vocabulary improvement. Additionally, it can be inferred that the three variables of summarising, re-reading, and note-taking would lead to better vocabulary learning and reading comprehension ability when comparing the effects of the cognitive strategies of summarising, note-taking, and re-reading as the three approaches on learners' L2 vocabulary knowledge and reading comprehension development. In regard to teach and learn English reading comprehension and vocabulary, summarising, rereading, and taking notes are advantageous, especially for high school EFL students.

In order to enable students in Oman's educational institutions reach a high level of education, it is evidently necessary to develop reading abilities and vocabulary building. One of these problems is that the majority of professors still use conventional techniques of instruction. While some educators try to use successful cognitive strategy variables to aid children with reading and vocabulary, others who are knowledgeable about recent developments in educational psychology do the opposite. Another problem is that teachers are unaware of the cognitive distinctions between male and female students that are crucial to the development of their vocabulary and reading comprehension skills. These days, new teaching methods are being adopted all over the world, mostly in Oman. A research study is required to inform teachers of these topics' benefits and spark their attention.

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Authors' contributions

All data analysis, drafting and revising the paper was done by the author and agreed to be responsible for all the aspects of this work.

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The author declares that there is no conflict of interest.

Availability of data and materials

Not Applicable

Use of Artificial Intelligence

Not applicable

Declarations

Authors declare that all works are original and this manuscript has not been published in any other journal.

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