

Improving Reading Comprehension and Vocabulary Knowledge through Cooperative Learning Strategies: A Case of Nursing Students at Zanjan Medical University

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Abstract

Background: Cooperative learning as an educational approach plays a crucial role in English as a second/foreign language education. The effective role of cooperative learning seems to be so dominant that it deserves further investigation.

Objectives: This study aimed at investigating the impact of cooperative learning strategies on reading comprehension and vocabulary learning of nursing students in Zanjan University of Medical Sciences.

Methods: Seventy eight female nursing students, who were enrolled in two intact classes, constituted the participants of the study. To select participants with equal language proficiency, the researchers administered the Oxford Placement Test. Forty learners whose scores fell between one standard deviation below and above the mean were selected. Then, the researchers used a pre-test to check the participants' reading comprehension and vocabulary knowledge of the participants. The participants were randomly divided into experimental and control groups. The experimental group (n=20) was taught through the cooperative strategies while the control group (n=20) was instructed through conventional methods. After the treatment, a post-test was employed to measure the students' reading comprehension and vocabulary knowledge. The data was analyzed by independent sample t-test using SPSS-16 software.

Results: The results of the Independent Samples *t*-test showed that cooperative strategies have a significant influence on the participants' reading comprehension and vocabulary knowledge.

Conclusion: It was concluded that cooperative learning should be practiced in reading and vocabulary classes as they solve many of the problems students face in traditional settings.

Keywords: cooperative learning strategies, reading comprehension, vocabulary knowledge

Introduction

Cooperative Learning (CL), characterized as a social process in which knowledge is acquired through the interaction between the group members, has proved to have positive educational values in the English as a second/foreign language (ESL/EFL) classrooms [1]. It has repeatedly proved to be an effective method in raising the standards of education and maximizing learning outcomes as it encourages learning to take place and allows communication skills to foster among learners [1-7]. Several research studies have

proved that CL creates great opportunities for EFL learners to practice their English in the classroom. It can help L2 learners develop effective communication skills and improve their motivation to learn [2]. A distinctive feature of CL is that it provides opportunities for high-ability and low-ability students to work together through a variety of strategies such as Student Teams-Achievement Division (STAD), Teams-Games-Tournaments (TGT), Cooperative Integrated Reading and Composition (CIRC), Team Accelerated Instruction (TAI), Jigsaw,

Group Investigation (GI), and so forth [2]. CL is suggested to have positive and significant influence on improving reading comprehension (RC) skills [3,8,9]. Al Jaffal proposes that reading is a critical educational skill because it influences all academic disciplines, and it is closely linked to concepts such as problem solving, critical thinking, organizing ideas, reasoning, creativity, and so on. RC is one of the challenging skills for L2 learners because they are required to cope with new vocabulary, information, culture, and language structures written in the target language [3].

An important concept, which is closely linked to reading comprehension, is the learners' L2 vocabulary knowledge (VK). Considering the importance of vocabulary acquisition in language teaching, Pyle (2009) proposes that vocabulary constitutes the basic building blocks of the language and carries the central message in communication. VK facilitates the processes whereby learners put thought into words and words into thought. From words come larger structures, namely sentences, paragraphs, and whole texts, and through these connections of words, language learners may use and manage the ideas that come to their minds [10]. Some studies assert that the knowledge of words is the most crucial factor in RC. Salah (2008) maintains that VK has a critical role to play in reading comprehension, especially in second language acquisition [11].

Vocabulary knowledge and reading comprehension are closely related, and this relationship is not one-directional. In other words, VK can help the language learners to comprehend written passages, and readings can lead to vocabulary growth among students. It is suggested that no RC is possible without understanding the words that exist in the text. Similarly, as the percentage of unknown vocabulary in a given text increases, the possibility of comprehending the text decreases [11].

CL strategies seek to engage students in the learning process and reinforce the social nature of learning, which often makes learning more enjoyable [12]. Therefore, the purpose of this study is to shed some light on the pros and cons of cooperative teaching and learning techniques, and to provide a new cooperative L2 learning context

to eliminate the prior traditional mistakes and also to provide more outlets for the betterment of L2 RC and vocabulary enhancement. Concerning the significance of RC and VK in Iranian EFL context, the current study aims to answer the following questions:

Q₁. Is there any significant difference between RC of nursing students instructed by cooperative learning strategies and that of the students instructed by traditional methods?

Q₂. Is there any significant difference between VK of nursing students instructed by cooperative learning strategies and that of the students instructed by traditional method?

There are several cooperative strategies available for EFL/ESL teachers to choose from. L2 teachers simply need to choose the model and structure that best suits their classes and their students' needs and expectations. Kagan (1994) suggests, for example, that 'Round Table' has been successfully applied in writing classes, 'Jigsaw' is more appropriate to be used in teaching reading, and 'Think-Pair-Share' may be better suited to develop language learners' oral and aural skills [13]. The researchers in this study employed the following strategies:

Student Teams-Achievement Division (STAD): STAD has five stages: class presentations, teams, quizzes, individual improvement scores, and team recognition. STAD is a very effective way to encourage students as it not only involves the group's progress but also their own. Students are usually more motivated when they have a chance of attaining a tangible proof of their success. However, it may be difficult for teachers to implement. First, a base score must be calculated for each student. The base score is the level of knowledge and skill that students have before beginning the STAD unit. After the quizzes have been conducted and graded, the students receive improvement points. These improvement points are used to calculate the group grade. Second, in order to follow the initial ideology of STAD, the teacher must take great care when assembling the groups. Race, ethnicity, gender, and mixed abilities are all factors that must be considered [14]. In L2 classes, teachers can implement this strategy in order for students to learn vocabulary, spelling, or syntax. It may even be used for material such as content questions from reading material. **Number Heads Together (NHT):** NHT is

a relatively simple cooperative strategy recommended by Kagan and Kagan (2009) which is especially useful for checking students' understanding of lesson objectives. This strategy creates positive interdependence and individual accountability within groups of four learners since each individual student is potentially responsible for the success of his or her group. A successful response brings success for both the group and the individual learner [15]. NHT provides teachers with relatively easy-to-implement, low cost, and effective ways to teach the essential knowledge base to support the students' learning of important concepts [16].

The NHT strategy involves some stages as follows:

1. Each student is first assigned to a small heterogeneous group consisting of at least one each high, average, and low achieving students.
2. Students are allowed to number themselves 1,2,3, or 4.
3. Students would sit together in their groups.
4. The teacher would direct a question at the whole class.
5. Students are given time (e.g., about one minute) to put their heads together, come up with the best answer, and make sure everybody on their group knows the answer.
6. Then the teacher would say: all number (1,2,3,or 4 students) who know the answer, raise your hands.
7. One student would be called on to answer.
8. Then the teacher would ask the other students with the same number if they agreed with that response.
9. After that the teacher would provide feedback.
10. Finally, a quiz may be given to test the students learning.

The Jigsaw: This strategy has become a very popular CL technique, perhaps because it is relatively easy to implement. During a Jigsaw task, students are divided into small groups. Each student, then, has to investigate a different aspect of the subject of the task. After their investigation, they meet up with students from other groups who have been exploring the same aspect of the assignment. After students have conferred with these "expert" groups, they return to their original groups where they have to share their findings with their teammates in such a way that all members of the group learn the material [17]. The

Jigsaw technique is suggested to be well suited for tasks that are aimed at familiarizing students with specific content. This could mean that it may be used for projects related to novels or other reading material or assignments that require students to investigate certain material [18]. Jigsaw II is just like the original Jigsaw, but it is more appropriate for reading classes as its focus is on reading texts that L2 learners must read, explore, and share with their group members. Jigsaw II is a suitable technique for any task in which students are to explore written texts. Students are expected to work together in heterogeneous groups where each member focuses on a different topic of the narrative. As in the original Jigsaw, students become experts on their own topic. Then, they meet with experts of the same topic from different groups and hold discussions. The experts, then, come back to their original group and teach the group about their topic. After this step has been completed, students take exams or quizzes on all of the topics, similar to those which are implemented in STAD. Jigsaw II uses very similar scoring system as STAD does. Base scores are calculated before each task, and each individual's improvement score is contributed to a group score (as cited in Árnadóttir, 2014) [18]. Al-Yaseen (2014) proposes that Jigsaw II developed by Slavin (1995) is an activity useful for teaching reading. In his view, in Jigsaw II procedure students receive expert topics and read assigned material to locate information. Then, they meet to discuss their topics in expert groups. Experts return to their team to teach their topics to their teammates. Finally, team scores are computed based on team members' improvement scores and individual improvement scores.

Methods

A total of seventy-eight nursing students at Zanzan University of Medical Sciences, who were enrolled in two intact classes, constituted the participants of this study. The participants were in the 20-24 age range. In order to select students with approximately equal level of language proficiency, the researchers administered Oxford Placement Test (OPT). Cronbach's Alpha reliability coefficient for OPT was calculated to be 0.71. As a result of the test 40 intermediate level students whose scores fell one standard deviation above and below the mean score were selected.

To check the participants' RC and VK prior to the experiment, the researchers employed a pre-test of RC and vocabulary.

This study was a quasi-experimental research in which the participants were randomly put in two groups; one experimental group, that was classified into five sub-groups each including four students in order to fulfill the requirements of cooperative learning strategies, and one control group who worked in a traditional language learning setting. CLS is the independent variable, and RC and VK are dependent variables.

The pre-tests of RC and VK consisted of 40 multiple-choice items which were randomly chosen from the sample tests frequently used to measure nursing students' reading comprehension and vocabulary knowledge at Zanjan University of Medical Sciences. The researchers selected these items because they seemed to be equivalent to what students studied during the experiment, and the same tests are typically used as the summative tests to measure their final performance.

To improve the validity of the tests, the researchers revised the items several times after consulting with a team of experienced EFL instructors. The tests were piloted with 17 students similar to the target group, and Cronhach's Alpha reliability coefficient was calculated to be .68 for RC and .74 for VK tests. The post-tests of RC and VK were parallel to the pre-tests and went through the same process of piloting and validation. Both pre- and post-tests had the same number of items, were equal in content, difficulty level, and psychometric properties. All items in both tests were presented in a multiple-choice format with four alternatives. The time allotted for the tests was 80 minutes. Since this was a teacher-made test, it was piloted first and Cronhach's Alpha reliability coefficient was calculated to be .73 for RC and .69 for VK. The book *Cover to Cover 2* by Richard R. Day and Kenton Harsch (2008) was used in this project as the compulsory reading-based course book taught in nursing department at ZUMS. The book consists of 12 units and each unit focuses on reading comprehension and vocabulary.

The researchers decided to employ Student Team-Achievement Division (STAD), Numbered Heads Together (NHT), and Jigsaw II as cooperative learning strategies. The rationale behind

employing these strategies was that they were the most frequently and the most successfully used methods in teaching L2 reading and vocabulary skills as suggested in literature review.

In this study, employing STAD technique, the instructor presented the lesson to the class and then the students worked in groups and ensured that they had mastered the lesson. After that, the students took individual quizzes on the material. Their scores were compared to their own past averages, and points were awarded on the basis of the degree to which they met or exceeded their own earlier performance. This technique encourages the students to take up responsibility for other members in their group as well as themselves. Thus, in this way it is guaranteed that all group members with different levels are equally motivated to do their best.

In Jigsaw II technique, the teacher first gave an explanation regarding the reading material, then asked some questions in relation to the text and assigned each question to different members in each group. The students with similar question from different groups met each other as an expert of their group to find the answer of the question. Together, the experts researched the question (similar question), discussed, and cleared up with each other. As they found the answer, each student turned back to their group, and acted as a tutor to the group on his special question. And finally, the teacher randomly called them to answer the questions.

In NHT technique, the members of the groups were assigned a number from one to four, the teacher first gave an explanation regarding the reading passage. Then, the teacher or one of the students asked a question based on the reading passage, and the students in each group researched the answer and put their heads together to come up with an answer to the question. The teacher called a number from one to four. The person with that number gave and explained their group's answer.

In contrast to the participants in the experimental group, the control group students received traditional teacher-fronted instruction throughout the classroom time. In this class, the teacher began each new reading passage by reading it aloud and then translating the sentences into Farsi. She explained the vocabulary items and grammar rules in Farsi and asked the students to do the

exercises individually either in the classroom or at home. Classroom interaction was largely teacher-initiated, and student-student interaction was limited. It was made sure that no cooperative strategy was practiced in this class.

This research project was carried out for three months from early October to late December 2019. During the term, the classes met once a week for three hours during which 6 units of the

book were covered along with respective exercises, tests, and revisions.

Results

An independent sample t-test was run in order to compare the differences between the experimental and control groups in pre-test of RC. As displayed in Table 1, the mean scores for the experimental and control groups on this test are 9.35 (SD= 3.64) and 8.55 (SD= 3.26), respectively.(Table1).

Table 1: Descriptive Statistics of RC Pre-test

PreRC	Groups	N	Mean	Std. Deviation	Std. Error Mean
	Experimental	20	9.3500	3.64583	0.81523
Control	20	8.5500	3.26827	0.73081	

As displayed in Table 2, the results of the independent sample t-test ($t(38) = 0.731$, $P = 0.469 > 0.05$, $r = 0.114$ which represents a weak effect size) indicate that there is not any significant difference between experimental and

control groups on pre-test of reading comprehension. Thus, it can be concluded that the two groups enjoyed the same level of reading comprehension skills prior to the experiment. (Table 2).

Table 2: Independent Samples Test of RC Pre-test

PreRC	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Equal variances assumed	0.805	0.375	0.731	38	0.469	0.80000	1.09484	-1.41640	3.01640	
Equal variances not assumed			0.731	37.555	0.469	0.80000	1.09484	-1.41726	3.01726	

An independent sample t-test was run in order to compare the differences between the experimental and control groups in VK pre-test. As displayed in

Table 3, the mean scores for experimental and control groups on this test are 9.70 (SD= 3.88) and 8.95 (SD= 3.85), respectively. (Table 3).

Table 3: Descriptive Statistics of VK Pre-test

PreVK	Groups	N	Mean	Std. Deviation	Std. Error Mean
	Experimental	20	9.7000	3.88113	0.86785
Control	20	8.9500	3.85903	0.86291	

The results of the independent sample t-test ($t(38) = 0.613$, $P = 0.544 > 0.05$, $r = 0.096$ which represents a weak effect size) indicate that there is not any significant difference between the

experimental and control groups on pre-test of VK. Thus, it can be concluded that the two groups enjoyed the same level of vocabulary knowledge prior to the treatment. (Table 4).

Table 4: Independent Samples Test of VK Pre-test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
PreVocab	Equal variances assumed	0.048	0.828	0.613	38	0.544	0.75000	1.22383	-1.72752	3.22752
	Equal variances not assumed			0.613	37.999	0.544	0.75000	1.22383	-1.72752	3.22752

A post-test of reading comprehension was administered to all students after completing the instruction. As indicated in Table 5, the mean

scores for the experimental and control groups on RC test are 18.00 (SD= 1.62) and 13.95 (SD= 2.87), respectively.(Table 5).

Table 5: Descriptive Statistics Comprehension Test by Groups

Comprehension Test	Groups		N	Mean	Std. Deviation	Std. Error Mean
	Experimental	Control				
		Experimental	Control	20	18.0000	1.62221
	Control		20	13.9500	2.87411	0.64267

An independent sample t-test was run to compare the experimental and control groups' mean scores in the RC test in order to probe the effect of cooperative strategies on the students' reading comprehension. The results of the independent t-test ($t(38) = 5.488$, $P = 0.000 < .05$, $r = 0.655$ which represents a strong effect size) indicate that there is a significant difference between experimental

and control groups' mean scores on the post-test of RC; the experimental group outperformed the control group on reading comprehension test. Thus, it can be concluded that the first null hypothesis (i.e, there is no significant difference between RC of nursing students instructed by CLS's and that of students instructed by traditional method) is rejected. (Table 6).

Table 6: Independent Samples Test of Comprehension by Groups

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
Comprehe nsion Test	Equal variances assumed	8.094	0.007	5.488	38	0.000	4.05000	0.73797	2.55605	5.54395
	Equal variances not assumed			5.488	29.990	0.000	4.05000	0.73797	2.54284	5.55716

In order to determine the participants' knowledge of vocabulary, a post-test of VK was administered to all students after completing the instruction. As indicated in Table 7, the mean scores for the

experimental and control groups on VK post-test are 17.80 (SD= 1.43) and 14.60 (SD= 2.50), respectively.(Table 7).

Table 7: Descriptive Statistics of Vocabulary Test by Groups

Vocabulary Test	Groups		N	Mean	Std. Deviation	Std. Error Mean
	Experimental	Control				
		Experimental	Control	20	17.8000	1.43637
	Control		20	14.6000	2.50053	0.55913

An independent sample t-test was run to compare the experimental and control groups' mean scores in the vocabulary post-test. The results are

presented in Table 8. The results of the independent t-test ($t(38) = 4.963$, $P = .000 < .05$, $r = 0.617$ which represents a strong effect size)

indicate that there is a significant difference between the experimental and control groups' mean scores on the vocabulary knowledge test; the experimental group outperformed the control group. Thus, it can be concluded that the second

null hypothesis (i.e, there is no significant difference between VK of nursing students instructed by CLS's and that of students instructed by traditional method) is rejected. (Table 8).

Table 8: Independent Samples Test of Vocabulary by Groups

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Vocabulary Test	Equal variances assumed	5.839	0.021	4.963	38	0.000	3.20000	0.64482	1.89464	4.50536
	Equal variances not assumed			4.963	30.308	0.000	3.20000	0.64482	1.88367	4.51633

Discussion

This study was an attempt to shed light on the effects of cooperative strategies on Iranian Nursing students' RC and VK. Data analyses revealed that there was a statistically significant difference between the performances of the experimental and control groups on RC test at the end of the experiment. The experimental group students received better results than the control group students. This difference can be linked to the fact that the experimental group students enjoyed a cooperative setting in which they teamed up with peers and interacted with them to understand the passages. The control group students, on the other hand, studied the same lessons in a traditional setting and did not employ any form of cooperative or team-based strategies during the experiment.

Numerous Iranian and foreign studies support the findings of this research project. In a recent study, Mohammadi and Davarbina (2015) discovered that both NHT and Jigsaw techniques can improve EFL learners' reading comprehension, with Jigsaw instruction being more influential than NHT. They also agreed that conventional instruction had a little impact on the learners' reading comprehension achievement[19]. In a similar context, the results of Jalilifar's study (2010) revealed that STAD is a more effective technique in improving EFL reading comprehension achievement [20]. Khorshidi (1999) also found that students who studied in a cooperative setting outperformed the control group learners who studied in a traditional setting [21].

Another study that supported the findings of the current research was conducted by Marzban and Alinejad (2014) whose results indicated that the experimental group outperformed the control group on RC tests [22]. In a somewhat different context, the results of Bolukbas et al.'s (2011) study showed that cooperative learning method applied in experimental group had a higher effect on RC skills compared with the effects of traditional teaching methods [23].

Pan and Wu's (2013) study indicated that cooperative learning instruction is favorable for improving English RC [24]. The findings of Durukan's (2011) study revealed that there was a statistically significant difference between the reading and writing skills of the experimental and control groups in terms of academic achievement and retention [23]. This difference was discovered in favor of the cooperative integrated reading and composition technique.

These and other studies conducted in the field of EFL, support the results of the current research and imply that traditional instruction, including memorization, translation, word lists, and so on is not a valuable way to improve RC skills. Traditional teacher-fronted classrooms in which there is a lack of learner interaction and cooperation fails to meet the learners' needs in comprehension classes [25,26].

The results of the data analyses on VK tests indicated that compared to the control group, the experimental group students received better results in their VK test after the experiment. These results support the effectiveness of CL strategies on vocabulary knowledge of nursing

students at Zanjan University of Medical Sciences.

This finding is consistent with the earlier studies in the field. Similar to the current research project, Bilen and Tavil (2015) evaluated the effectiveness of cooperative learning strategies in vocabulary skills of 4th graders in Turkey [27]. The findings of this study revealed a significant difference between the results of the experimental group and those of the control group on the post-tests. The experimental group obtained higher scores on the post-test in comparison with the control group learners who were not taught in a cooperative setting. Huong (2006) also investigated vocabulary learning in a cooperative setting [28]. The results of this study showed that group work could affect the learning vocabulary in a positive sense.

Zarei and Gilani (2013) investigated the effects of cooperative techniques on L2 vocabulary comprehension and production. They concluded that cooperative strategies are not equally beneficial, and they seem to have differential effects on various language skills [29]. In a different research project, Zarei and Keshavarz (2012) investigated the effects STAD and CIRC on reading and vocabulary learning achievement of Iranian female L2 learners [30]. The results indicated that the CIRC model had statistically significant effects on RC and vocabulary learning, particularly for elementary EFL learners.

Several other studies are in favor of cooperative learning strategies and suggest that traditional modes of learning are not favorable for boosting L2 learners' VK [31-33]. Stahl (2003) concluded in his study that memorization of words and their definitions in a traditional setting was not an effective way to help improve students' vocabulary and reading skills. In a CL setting, on the other hand, students engage in meaningful vocabulary activities through interactions and working in groups and this, in turn, leads to a significantly higher achievement and a more successful and promising vocabulary learning [34]. The findings of the current study is in line with the above-mentioned results implying that conventional approaches to vocabulary learning/teaching are not so effective as their more recent counterparts such as cooperative strategies of language teaching.

Conclusion

The present research investigated the effect of cooperative strategies on reading and vocabulary performance of nursing students at ZUMS. In Iranian EFL settings, the English course taught in university level is a compulsory reading-based course. The results showed that the cooperative strategies have a significant influence on Iranian EFL students' reading and vocabulary performances. It was revealed that the experimental group students outperformed the control group students both in RC and VK. Therefore, it can be concluded that cooperative strategies such as STAD, NHT, and Jigsaw II have positive educational values in EFL classrooms and create opportunities for EFL learners to practice English with their peers in the classroom.

The findings of this project suggest clearly that cooperative strategies have positive contributions to EFL learners' reading and vocabulary performance; however, teachers may face some problems implementing the technique in actual classroom settings. Some students are unfamiliar and/or unwilling to work in groups, or they cannot get along with each other and complain all the time. Regardless of the hindrances put forward, cooperative strategies are highly recommended to be practiced in reading and vocabulary sessions as they solve many of the problems students face in traditional settings.

In this study, it was also revealed that L2 reading and vocabulary skills can be enhanced via cooperation in the classroom settings. As Castle (2014) suggests, cooperative strategies engage students in the learning process and reinforce the social nature of learning, which often makes learning more enjoyable [12]. Therefore, Iranian EFL teachers and curriculum developers are required to fully investigate cooperative teaching strategies and to provide the students with a native cooperative L2 learning context to eliminate the prior traditional mistakes and also to provide more outlets for the betterment of L2 reading comprehension, fluency, and vocabulary enhancement.

This study is suggested to be carried out with a larger and more diverse sample to see whether the same results will be obtained. This would help maximize the validity of the study results, and possibly reveal additional information on

cooperative learning, RC, VK, and reading fluency in Iranian EFL context.

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of the present paper.

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