

*Full Length Research Paper*

# On the effectiveness of collaborative techniques on L2 reading comprehension

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The present study examined the effects of selected collaborative techniques on students' reading comprehension. The participants of the study were 86 adult pre-intermediate level English learners studying at institutes in Qazvin. The participants were in five groups; each group was randomly assigned to a different treatment condition. They received collaborative techniques for 21 sessions. The collaborative techniques included jigsaw, rotating circles, snowball, think-pair-square, and word webbing. At the end of the experimental period, a reading comprehension posttest was administered. A one-way ANOVA procedure was used to analyze data. Result showed that Snowball was the most effective technique on reading comprehension. The findings of the present study may have theoretical as well as practical implications for teachers, learners and syllabus designers.

**Key words:** Collaborative learning, reading comprehension, jigsaw, rotating circles, snowball, think-pair-square, word webbing.

## INTRODUCTION

The story of collaborative learning is a story of sink or swim together. In the past decades, collaborative learning methods and techniques have been widely used in English as a second language (ESL) and English as foreign language (EFL) settings (Momtaz and Garner, 2010). There seems to be mixed feelings among experts and teachers about the usefulness of collaborative learning. On one hand, most teachers believe collaborative interaction is beneficial to learning and helps to enhance the learning process, especially in second/foreign language learning situations. It is believed to be suitable and powerful, particularly for low-achieving students (Lai, 2011). On the other hand, some teachers believe collaborative method is problematic for several reasons. They do not like missing their traditional role in the classroom. Others insist that collaborative learning is not suitable for students. They believe that students learn at different speeds, some of them may take over the group (Tinzmann et al., 1990).

What is more controversial is that there are many different types of collaborative techniques. And the issue of which of these techniques are more beneficial than

others is shrouded in controversy. For one thing, studies have resulted in mixed results about the effectiveness of collaborative techniques. For another, most studies have focused on only one or two techniques, and have usually compared the effectiveness of collaborative techniques against a control condition. Few studies have focused on a direct comparison of the effectiveness of collaborative techniques, especially on L2 reading comprehension. In an attempt to partially fill this gap, the present study aims to investigate the effect of five collaborative techniques on reading comprehension. These techniques include jigsaw, rotating circles, snowball, think-pair-square, and word webbing. More specifically, it addresses the following research question:

Are there any significant differences among the effects of the selected collaborative techniques on L2 reading comprehension?

## Literature review

Human beings are social and like to learn in a social

context; thus, collaborative learning is a proper response to this tendency in human nature. Dillenbourg (1999) defines collaborative learning as "a situation in which two or more people learn or attempt to learn something together and solve a problem" or "mutual engagement of participants in a coordinated effort to solve a problem together".

Collaborative learning has several advantages. It increases self-esteem and motivation among students, improves complex and cognitive thinking, creates positive feelings among students and about school, and makes responsible students (Jacobs et al., 2002). Also, Vygotsky (1978) believes that children learn together and increase their individual skills in group activities. Gokhale (1995) adds that interest and critical thinking rise among collaborative groups. Students can become critical thinkers.

Pair and small group activities give more time to students for speaking in the target language. In addition, learners feel more comfortable and less anxious when they interact with peers in the group. Their self-confidence increases through group activities (McDonough, 2004).

Furthermore, Wills (2007) holds that group working reduces the fear of failure among students. Students can access the stored information much easier and quicker during a cooperative learning situation. DelliCarpini (2009) adds that "cooperative learning creates multiple opportunities for comprehensible input and output".

Despite the advantages of collaborative learning, there are some arguments against collaborative learning. According to Tinzmann et al. (1990), teachers do not like collaborative learning because they know that a collaborative classroom is noisier than a traditional classroom and they do not want noisy classrooms. Another reason is the preparation time for collaborative learning. Some teachers do not know how to use time appropriately in a collaborative classroom, so they think collaborative learning wastes the time of the class (Tinzmann et al., 1990). The third reason is individual differences among students. Some teachers believe students with individual differences cannot be together in one group. Such teachers think some students may not accept responsibility in a group and only look at other members without participating in group activities and the learning process.

Tinzmann et al. (1990) mentioned several roles for teachers in a collaborative classroom. The first role is as a facilitator. Teachers help students connect new information to their prior knowledge. Teachers can facilitate collaborative learning by designing different tasks. The second role for the teacher is modeling. Modeling may involve thinking aloud and demonstrating. The last role is coaching. Teachers help the students to provide a strategy and use it in the learning process. The teacher is a supporter, an observer, a change agent, and an advisor in a cooperative classroom (Wang, 2007).

Students are at the center of the collaborative learning process. Tinzmann et al. (1990) stated that students are collaborators and active participants in collaborative classrooms. Students play different roles in collaborative learning such as facilitator, time keeper, checker, encourager, recorder, summarizer, elaborator, and observer in their own groups (Farrell and Jacobs, 2010). They are believed to be more than 100 techniques used in collaborative learning. These techniques help teachers and students understand the meaning and the purpose of collaborative learning. Each of these techniques has different effects and is useful for students and teachers in diverse situations. Keyser (2000) argues that teachers should know the goals of the teaching and learning, then select suitable cooperative techniques in their classrooms accordingly.

A number of studies have investigated various aspects of collaborative learning and techniques. Pamela (1994) compared cooperative learning groups (drill and review dyads, cooperative response technique, and group grading interview) in his study. The results showed that the cooperative learning strategies had positive effects on the learning process, especially in multicultural classrooms. Meanwhile, the cooperative response technique was more powerful than the other cooperative techniques in this study.

Critical thinking is one of the most important factors in collaborative learning. Gokhale (1995) compared individual and collaborative learning, but he also implemented critical thinking in both of these groups. The posttest was based on drill-and-practice and critical thinking items. The individual group received a task and the students worked on the worksheet for 30 min. The findings showed that students worked corporately better than individually and the students in the collaborative group answered critical thinking questions better than the ones in the individual group.

Webb (1991) studied the role of gender in collaborative interaction. The results showed that boys preferred to receive request for help, but there was no difference in girls' and boys' abilities. In another study, Adeymi (2008) investigated three teaching strategies (cooperative learning, problem solving and conventional). The results showed that students liked cooperative learning and problem solving strategies more than the conventional strategies.

Kim and McDonough (2011) implemented collaborative learning to different kinds of tasks. They studied the role of pre-task modeling in collaborative learning interaction. They divided students into two groups. One group received videotaped models of collaborative interaction before carrying out the task. The other group did not use pre-task modeling. The findings showed that the first group was more successful in completing the tasks and demonstrated more collaborative pair dynamics modeling.

Wang (2011) studied collaborative learning as a new

method for improving college students' autonomy in China. He had two groups of students. The first group included 64 students who worked corporately, whereas the second group included 62 students who were taught in a traditional way. The findings showed that collaborative learning increased autonomy, and students learned better than the traditional way.

Some researchers have focused specifically on collaborative learning and its effects on reading. Jacobs and Hannah (2004) studied cooperative learning and reading aloud. They used collaborative techniques like circle of speakers, K-W-L, brainstorming, jigsaw, and so on. Findings showed that students liked these techniques and had more comprehension and motivation during the learning process.

Momtaz and Garner (2010) conducted a study on how collaborative learning improved EFL students' reading comprehension. They taught reading comprehension according to collaborative strategic reading (preview, click and clunk, get the gist, and warm-up). The students used these strategies while they were reading texts collaboratively. They selected four texts for each class. Students read two of them collaboratively in small groups of 4 to 5, and two of the texts were read individually. After reading the texts, they answered 10 comprehension questions. They compared the results after 4 weeks. They noted that the class which used collaboration was more successful and answered questions better than the other class. This study tested collaborative techniques on reading comprehension, but did not make it clear which collaborative technique was better for reading comprehension purposes.

The purpose of the present study is to compare the effectiveness of for collaborative techniques on L2 reading comprehension.

## METHODOLOGY

### Participants

The participants were 86 male and female EFL learners. They were studying at language institutes in Qazvin, Iran. The age of the participants ranged from 17 to 21 years old and their level of proficiency was pre-intermediate to intermediate, as specified by the institute. Participants were studying in five classes. Each class was randomly assigned to a different treatment condition including jigsaw, rotating circles, snowball, think-pair-square, and word webbing.

### Instrumentation

There was a pretest to homogenize the participants. The participants were administered a Key English Test (KET) test before starting the new semester at their institutes.

This test contained 41 multiple-choice items. The instructional materials included five units of Top Notch (2 a) by Johnson and Ascher (2006). The book is used for pre-intermediate learners at language institutes. A total number of 5 reading texts were presented in 18 sessions, spanning one semester through collaborative learning techniques. At the end of the experimental period, all participants were given a 30-item reading comprehension test in multiple-choice format to gauge the participants' reading comprehension ability.

### Data collection procedure

The participants were in 5 groups. Each group was randomly assigned to one of the treatment conditions. Before they received the treatment, a KET test was administered to homogenize the participants in terms of their reading comprehension ability. The instructional materials included 5 units of Top Notch (2 a). Each group received instruction through one of the following collaborative learning techniques: jigsaw, rotating circles, snowball, think-pair-square, and word webbing.

#### Group A

Group A was instructed through the jigsaw technique. Jigsaw is one of the most popular collaborative techniques. There were 15 learners in this group. They were divided into four groups. This technique was taught in eight steps:

- Step 1:** A reading task was divided to different subtasks.
- Step 2:** The class was divided into groups of 3 or 4 members randomly.
- Step 3:** Each group worked on one subtask.
- Step 4:** One student from each jigsaw group joined the expert group.
- Step 5:** They discussed the subtasks that they worked on. The subtasks were selected randomly.
- Step 6:** The students returned to their jigsaw groups.
- Step 7:** They presented other subtasks to their groups. They helped other members of the group with the subtasks they had learnt about in the expert group.
- Step 8:** At the end, each group had the whole task; the parts of tasks completed each other like different parts of puzzle by experts.

#### Group B

Group B received instruction through the rotating circles technique. Rotating circles technique is based on physical movement. The number of learners was 18 in this group. They were divided into three groups. Each

group was subdivided into two groups. There were 3 members in each subdivided group. The participants of this group were taught in five steps:

- Step 1:** The class was divided into groups of 6 members. Each of these groups of 6 was subdivided into 2 groups randomly.
- Step 2:** One subgroup was seated in an inner circle, with each student facing outwards. The other subgroup was seated in an outer circle. Around them each member faced inward towards a member of the inner circle.
- Step 3:** Each member of the inner circle had different subtasks. For about 5 min, the inner circle members discussed with the outer circle members opposite them.
- Step 4:** The outer circle was rotated one seat clockwise, so there was a new pair.
- Step 5:** The previous two steps were repeated until the outer circle was rotated by one complete turn.

### **Group C**

Group C was instructed through the snowball technique. Snowball technique is useful when the aim is to generate ideas. There were 20 participants in this group. This technique was taught in four steps:

- Step 1:** Each student received the same task. They had to work within a preset period of time (5 min, more or less).
- Step 2:** They worked on the task in pairs, they shared ideas.
- Step 3:** Pairs then formed groups of 4 to share their ideas and knowledge.
- Step 4:** Snowball was finished there or was continued to groups of 8, until they solved their problems.

### **Group D**

Group D received instruction through the think-pair-square technique. Think-pair-square technique is another collaborative technique for generating ideas. 16 learners participated in this classroom. This technique was taught in five steps:

- Step 1:** A task was given to class.
- Step 2:** Each student had a period of time to think about it and write her/his words.
- Step 3:** The student turned to a partner and shared their knowledge and ideas.
- Step 4:** Pairs joined another pair to compare their conclusions.
- Step 5:** They continued with another pair or stopped this process.

### **Group E**

Group E was instructed through the word webbing technique. Word webbing technique is a graphic organizer strategy that provides a visual of how words or phrases connect to a topic. There were 17 learners in this group. Four students were in each group, but one group contained 5 participants. It was taught in six steps:

- Step 1:** Students were divided into groups of 4 or 5 randomly.
- Step 2:** Each group received a butcher paper and different color markers.
- Step 3:** One student drew a circle in the middle of the paper and wrote the main idea in it.
- Step 4:** Each student added a concept to it with different color markers. They wrote subtopics in the corners.
- Step 5:** Each student selected one corner and wrote her/his idea. All students had a chance to add their ideas.
- Step 6:** Papers displayed around the classroom and each group reported their word-web.

### **Data analysis**

At the end of the experimental period, the posttest was administered to measure the participants' reading comprehension ability. Participants answered the 30-item reading comprehension test in multiple-choice format in 30 min. A one way ANOVA procedure was used to analyze the obtained data.

## **RESULTS AND DISCUSSION**

This study sought to investigate the effect of selected collaborative techniques (jigsaw, rotating circles, snowball, think-pair-square, and word webbing) on L2 reading comprehension. Descriptive statistics for the ANOVA are presented in Table 1. As shown in Table 1, the snowball group has the highest mean, followed closely by the word webbing group, the think-pair-square group, and the jigsaw group. The rotating circles group has the lowest mean. To see whether or not the differences among the means are statistically significant, the one-way ANOVA was used. The results are summarized in Table 2.

Based on Table 2, the F-value and significance level ( $F_{(4,81)} = 10.59$ ,  $p < 0.05$ ), are indicative of statistically significant differences among the means of the five groups. It can be claimed that different collaborative techniques have significant effects on the learners' reading comprehension. To locate the differences among the means of the five collaborative groups, a post hoc Tukey HSD test was used. The results of the post hoc

**Table 1.** Descriptive Statics for the ANOVA on Reading comprehension.

Variable	N	Mean	Std. Deviation	95% Confidence interval for mean	
				Lower bound	Upper bound
Jigsaw	15	21.46	3.46	19.54	23.38
Rotating circles	18	19.33	3.46	17.61	21.05
Snowball	20	25.25	2.44	24.10	26.39
Think-Pair-Square	16	22.06	2.76	20.58	23.53
Word Webbing	17	24.05	3.05	22.49	25.62

**Table 2.** The ANOVA procedure on reading comprehension.

Variable	Sum of squares	df	Mean square	F	Sig.
Between groups	392.091	4	98.023	10.595	0.000
Within groups	749.362	81	9.251		
Total	1141.453	85			

**Table 3.** Multiple comparisons of means for the learners' reading comprehension.

(I) group	(J) group	Mean difference (I-J)	Std. Error	Sig.
Jigsaw	Rotating circles	2.13	1.06	0.272
	Snowball	-3.78 <sup>*</sup>	1.03	0.004
	Think-Pair-Square	-0.59	1.09	0.982
	Word webbing	-2.59	1.07	0.124
Rotating circles	Snowball	-5.91 <sup>*</sup>	0.98	0.000
	Think-Pair-Square	-2.72	1.04	0.078
	Word webbing	-4.72 <sup>*</sup>	1.02	0.000
Snowball	Think-Pair-Square	3.18 <sup>*</sup>	1.02	0.020
	Word webbing	1.19	1.00	0.759
Think-Pair- Square	Word webbing	-1.99	1.05	0.334

comparison are presented in Table 3. Table 3 shows that there are significant differences between jigsaw and snowball groups, between rotating circles and snowball groups, between rotating circles and word webbing groups, and between snowball and think-pair-square groups.

The findings of the present study are in line with those of Momtaz and Garner (2010), who showed that collaborative learning improved reading comprehension. In addition, according to Zhang (2010), cooperative language learning has positive effects on students' learning and understanding, and it is more effective than individual learning. The results of the present study corroborated this claim.

There are few studies on the comparisons among collaborative techniques. Most researchers have

investigated only one collaborative technique or have compared one technique with the traditional method. One of the techniques used in the present study was jigsaw. It is one of the most popular and well-known collaborative techniques (Jacobs and Hannah, 2004; Littlewood, 2009). Walker and Crogan (1998) reported that jigsaw improves academic performance, but they did not mention that jigsaw improves comprehension. Their findings somehow contradict the results of the present study. Hanz and Berger (2007) could not show the positive effect of jigsaw on academic performance. According to Moskowitz et al. (1985), jigsaw has no positive effects on students. Their findings support the results of the present study that jigsaw is not the best technique.

On the other hand, Nurcahyo (2009) and Khoshsima et

al. (2011) showed that jigsaw was effective in reading comprehension. However, it seems that the use of jigsaw could not improve comprehension in the present study. Jigsaw is like a puzzle; all students are responsible for completing this puzzle. Expert groups encourage individual accountability among students (Jacobs and Hannah, 2004). However, sometimes one of the students in the expert groups cannot convey information well or does not listen to others correctly, and this affects all his/her teammates, and the technique fails. This may be one of the reasons why jigsaw had no positive effect in the present study and was not successful.

Rotating circles is a newer collaborative technique and is not as popular as jigsaw. The rotating circles group did not have good results on the posttest. This could be because the teacher and students were less familiar with this technique. The teacher could have failed to apply this technique like the other collaborative techniques in the present study. This technique is based on physical movement (Littlewood, 2009). The findings of Littlewood's study are different from the results of the present study. He showed that the rotating circles technique could decrease social loafing and improve the learning process. However, Iranian students are not used to physical movement in their classrooms. They learn to sit without any movements and listen to their teachers. This might explain why the rotating circles group failed in the present study. In addition, physical movement may not be suitable for all levels of students. It may be better for kids but not necessarily for older learners.

In this study, snowball was the best technique in reading comprehension. According to Farrell and Jacobs (2010), the snowball technique highlights the advantages of heterogeneity, so it is suitable for generating more ideas and information. Students liked this technique and took part in these activities eagerly. Furthermore, each student had enough time to work alone before joining the group. Supporting Farrell and Jacobs' findings, the snowball technique turned out to be more effective than the other techniques.

Another collaborative technique used in the present study was think-pair-square. It had good results too, but not as good as the snowball and the word webbing groups. This technique is like think-pair-share, with a little difference. Students in the think-pair-square group share their ideas with other pairs, not with the whole class. Littlewood (2009) points out that think-pair-square decreases premature closure in group activities. Walsh and Sanchez (2010) compared think-pair-square with other collaborative techniques for child development. The results were the same as the results of the present study.

One of the best techniques in the present study was word webbing. Barkley et al. (2005) support the effectiveness of word webbing by asserting that "this technique helps students analyze a complex concept by breaking it down into component parts and clarifying the relationships".

A number of factors may have affected the results of the present study, including the quality of interaction among students, the level of proficiency, culture, and so on. Tinzmann et al. (1990) point out that there are three conditions for collaborative classrooms. They believe collaborative learning fails in the absence of these three conditions. First, students should accept their responsibility in their group. Second, they should learn to face to face interact and help their teammates. Third, they need to learn group process skills. Not all these conditions were present for all the five groups in the present study. These conditions were not equal in the five collaborative groups, either. This may partly explain the differential performance of the participants of these groups on the posttests.

Another possible reason could have been the teachers' ability to implement each of the five collaborative techniques. Some of these techniques may have been harder for teachers to implement in class. Jigsaw was probably more familiar for teachers, hence more easily applicable. However, rotating circles was hard for teachers. This could be the reason why the rotating circles group did not have good results.

Another factor is an interaction among students. The nature of collaborative techniques requires that students be active in their classes. However, some students may have avoided group work. All these factors can create an unfavorable condition in collaborative classrooms.

Students should understand that all members of the group have one goal, and they should try for it. Adeymi (2008) believes that students must know the problem and try to solve it. They should know that all their individual works have direct effect on their group. Unfortunately, in the present study, some students tended to impose their ideas on their teammates (think-pair-square group).

Still another factor which could have contributed to the obtained results may have been the learners' proficiency level. As an example, in the course of the treatment, it was observed that rotating circles was not suitable for these students' level of proficiency and students were not serious about following this technique and were not comfortable with it. They thought the teacher did not support them. DelliCarpini (2009) is of a similar opinion. Similarly, Letendre (2009) argues that jigsaw is a collaborative technique useful for advanced learners.

## Conclusion

The results of the present study indicated that collaborative techniques were differentially effective on Iranian EFL learners' reading comprehension. The findings showed that snowball was the most effective technique in reading comprehension. The findings of the study also indicated that think-pair-square was more effective than jigsaw and rotating circles, and rotating circles was the worst.

To conclude based on the obtained results, it appears that collaborative techniques are not equally beneficial. They seem to have differential effects on the reading skill. It can also be concluded that there are a multitude of factors which can potentially influence or moderate the effect of each of the aforementioned collaborative techniques on language learning.

The findings of the present study can have implications for teachers and learners. The present study can help teachers and learners to understand the importance of collaborative techniques in language learning. Furthermore, the knowledge of how collaborative techniques affect various language skills and components may enable teachers to find new ways of teaching by collaborative techniques and increase students' motivation and attitude for attending classes. These techniques can increase learners' motivation to read and learn. They can also make the learning process more meaningful. Teachers can become creative in collaborative classrooms and assume a more facilitating role.

All in all, this study may have shed some light on some of the issues surrounding collaborative learning techniques and the effect they exert on language learning. At the same time, it has to be acknowledged that this study might have generated more questions that it has answered. This acknowledgment, coupled with the controversies already surrounding this issue, may warrant further research in an area waiting to be further explored.

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