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The effect of computer-assisted cooperative learning methods and group size on the EFL learners' achievement in communication skills

Ali Farhan AbuSeileek

Al al-Bayt University, P.O. Box (130040), Zarka, Jordan

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ABSTRACT

This study explored the effect of cooperative learning small group size and two different instructional modes (positive interdependence vs. individual accountability) on English as a Foreign Language (EFL) undergraduate learners' communication skills (speaking and writing) achievement in computer-based environments. The study also examined the effects of disclosing/blinding the participants' identities while interacting around computers on their post-test. The findings of the study revealed that the computer-based environment enabled the participants to blind their identities and reduce their anxiety from face-to-face debate, and so was very helpful in developing their communication skills. The use of the individual accountability mode was quite useful compared with the positive interdependence mode as it enabled all group members to perform their roles significantly. The 5-student group also significantly outperformed other groups of 2–7 members on the post-test communication skills. In conclusion, the findings of this study bring us a step closer to understanding the technique of cooperative language learning and group size.

1. Introduction

Classroom instruction modes can be categorized into different types. Jacobs and Ball (1996) classify them into whole class, group and individual. Group or cooperative learning has been one of the most widely used and successful methods of instruction. A small group presumably provides its members with opportunities to engage more deeply and actively in the learning process which may allow students a socially and emotionally safer climate with a small number of members (Davis, 1993). Herner, Higgins, Pierce, and Miller (2002) think that groups should contain no more than six people to maximize participation by all group members. Similarly, Jahang, Nielsen, and Chan (2010) propose small groups of two to five members to work to complete a team task. This study is based on small groups of 2–7 members. The value of the small group is that it promotes learning because students open themselves to new experiences (Barnes, 1992). Small group discussions promote active student participation and contribute to enhance self-learning processes. They also provide significant social contexts to explore ideas and negotiate meaning.

Moreover, there are many advantages for small cooperative language learning groups compared with other modes of grouping students in classroom instruction. Long (1990) lists five advantages of group tasks compared with collective whole class instruction. They include increasing the quantity of language use, enhancing the quality of the language used by students, providing more opportunities to individualize instruction, offering less threatening environment for language use, and motivating language learning. Using cooperative learning in ELT entails appropriately teaming students of differing levels of language proficiency in a supportive environment where promotive interaction can be generated (Ning, 2010). It appears that students feel less vulnerable and are less nervous about practicing language forms in front of their peers when they find themselves in the sheltered, nurturing environment of a bonded cooperative groups (Senior, 1997).

However, there are some disadvantages for the small cooperative language learning groups. Sometimes, it is not possible to avoid the parallel problems such as doing nothing by (a) certain group member(s), so the final group product does not represent the contribution of all members fairly, or doing everything by (a) certain group member(s) which may discourage others from participating. Small cooperative language learning groups may also promote an atmosphere of individualism and competition rather than cooperation. Some students may be reluctant to share when they speak or write because they are afraid of making errors. Also, Johnson, Johnson, and Stanne (2000) point out

E-mail addresses: alifarhan66@gmail.com, alifarhan@aabu.edu.jo.

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that successful collaboration is not easy because the participants may tend to avoid arguments and conflicts that may cause misunderstandings and hurt feelings during their discussions. This study introduces new small cooperative language learning groups methods and techniques that may avoid these problems.

Blinding students' identities may be helpful in developing communication skills. In this study, the use of computer-based environments enables the instructor to use the 'electronic secret pals' technique in which students in cooperative group work are blinded about the identities of each other. Despite the fact that they sit in the same classroom, they cannot recognize each other when they chat. They are given nicknames or numbers, and they hide their real names. According to AbuSeileek (2007), this may reduce their anxiety that stems from face-to-face cooperative debate. The computer-based environment may also motivate the shy students to be self-conscious and very keen to work in a non-threatening environment. Moreover, it is necessary that teachers engage in fostering a safe and non-threatening learning atmosphere to alleviate language anxiety and encourage risk taking in using English (Ning, 2010). Some learners are shy, passive and afraid to speak (Hata, 2003), inhibited (Wallace, 1999), and reluctant to participate (Roed, 2003) in foreign language classes. The use of computer-mediated communication may help them to get rid of their anxiety and become less worried as their identities are undisclosed.

Cooperative learning techniques include different modes. In this study, two types are used; positive interdependence and individual accountability (see Johnson, Johnson, & Smith, 1991). In this study, the term "positive interdependence" is used to mean that group-mates work together to complete a task. They are asked to arrive at a single product without assigning a role for each of them. Therefore, it is possible that some of them do nothing or everything and discourage others from participating. However, the term "individual accountability" includes specifying each student work on a task alone, and then he/she tells or shows the product to the group members. In other words, the student is asked to work alone first and then discusses or compares answers with other group members. In this mode of cooperative group learning, Long (1990) proposes that students should have time to prepare the language they are going to use before interacting with other group members. The performance of each individual student is assessed, and each member is responsible for contributing his or her fair share to the group's success.

This study explores cooperative language learning under two major headings: Research on cooperative language learning in computer-based environments and research on cooperative language learning methods and group structure.

1.1. Research on cooperative language learning in computer-based environments

A number of studies (e.g., AbuSeileek, 2007; Darhower, 2002; Greenfield, 2003; Jepson, 2005) have explored the relationship between cooperative language learning and computer-based environments. There is evidence that these settings facilitate communication (Cooper & Selfe, 1990), and enhance student motivation (Warschauer, 1996). Furthermore, computer-based instruction is useful for promoting linguistic self-learning skills. Mueller-Hartmann (2000) reports that computer-based learning allows learners to develop and express their views, and facilitates communication. The broader literature indicates that effective computer-based instruction and learning can provide an appropriate context within which technology can be used to support the learner's involvement in collaboration, authentic tasks, reflection, and dialog (Liaw, 2006; Oliver & McLoughlin, 2000). The analysis conducted by Jeon-Ellis, Debski, and Wigglesworth (2005) suggests that the computer-based context can provide students with opportunities for collaborative dialogs which are helpful for language learning. Furthermore, the learners in computer-based groups work collaboratively by providing guidance and helping each other (Darhower, 2002). Moreover, Mueller-Hartmann (2000) suggests that technology-enhanced language learning helps learners to develop linguistically and express their views. Gu (2002) also reports that computer-mediated communication (CMC) increases learners' linguistic input and output and their willingness to learn and interact.

Research (e.g., AbuSeileek, 2007; Fitz, 2006) indicates there is usually a positive relationship between cooperative language learning tasks in computer-based environments, and reducing anxiety and developing communication skills. Computer-assisted environment learning may provide greater participation opportunities for people in subordinate positions. For instance, it is an excellent atmosphere for the shy students to express themselves (Bruce, Peyton, & Batson, 1993). Moreover, Greenfield (2003) points out that computer-assisted learning reduces students' anxiety, fear, discomfort, or lack of confidence. Another study (Kamhi-Stein, 2000) reports that computer-assisted instruction motivates students who rarely participate in the physical classroom due to potential embarrassment. Shin (2006) also finds out that chat discussions kept the participants from feeling embarrassed, avoiding direct challenge or disagreement, and helped them save face. AbuSeileek (2009) notes that the student is not embarrassed to ask about a point he/she does not know in computer-based instruction. This is not available in other types of instruction where the student may be shy or afraid to ask the instructor in front of other classmates.

Furthermore, the anonymous nature of computer-based environment may have a unique effect on the participants. For example, Jepson (2005) points out that sociocultural patterns have emerged from the anonymous nature of the online environment, where students can participate with nicknames, "faceless". Some participants also use Internet chat rooms to play out their fantasy selves (Turkle, 1995). Computer-based environment has its effect on the quantity and quality of participation, and computer-based instruction, as compared to face-to-face learning, has an equalizing effect on the quantity and quality of participation because participants feel less anxious or shy (Warschauer, 2000). Fitz (2006) notes that shyness, lack of confidence and feeling of discomfort were related to students' participation less in computer-based learning and more in other settings. Finally, the computer-based environment may also motivate the shy students to be self-conscious and very keen to work in a non-threatening environment (AbuSeileek, 2007).

1.2. Research on cooperative language learning methods and group structure

Many studies (AbuSeileek, 2007; Mueller-Hartmann, 2000; Phuong-Mai, 2008) show that the cooperative learning technique is favored in the majority of educational institutions. Some studies analyzed group activities in ELT coursebooks. For instance, Jacobs and Ball (1996) investigated the structure of group activities in ELT coursebooks. The researchers examined the percentage of group activities in recent ELT coursebooks, the number of learners per group, the percentage of group activities labeled as fostering cooperation, and the common shortcomings of group activities provided in coursebooks, and how can these be overcome to enhance the probability of more effective student interaction. They find that group activities are widely used in ELT coursebooks. The findings of the study indicate a large number of

the structure of group activities in ELT coursebooks in the materials to encourage learners to make the most of the advantages of collaboration. They also report that the small number of members recommended for most group activities points to the working in pairs and in groups of three or four students, which "enhances the opportunities for each member to participate actively, and reduces the complexity of group management" P. 105.

Another study (Long, 1990) focuses on the type of interaction between the group members. It proposes three types of task for groups: Planned (students have time to prepare the language they are going to use before interacting with other group members) or unplanned, closed (students have one predetermined correct answer or small set of answers) or open, and one-way or two-way (each group member needs to send as well as receive information). According to Long, the planned tasks, open tasks and two-way tasks are more functional for enhancing language learning because providing opportunities for the learners to plan can increase the quantity and quality of the language they produce.

Moreover, Kagan (1992) introduced the pairs technique where a pair working on an activity, and then working with other pairs on the same task. In a group of four students, Kgan reports that pairs who worked on a task then worked with another pair on a task related to the same activity could work well and be functional for learning. Similarly, Gude and Nolasco (1991) designed 97 linguistic activities which foster cooperation and group activities. They proposed that a pair work on a task. At the same time, another pair worked on the same activity, and then they compared their answers. Each member of the pair was responsible for reporting their partner's ideas to the other pair. Other studies focus on heterogeneous groups (Owston, Widemana, Rondaa, & Browna, 2009) or heterogeneous (students are mixed to make sure that each group has low-medium-high ability members) versus friendship (students were free to choose their group members) grouping (Thanh & Gillies, 2010). However, little research has systematically evaluated collaboration levels in small language learning groups. For example, Jahang et al. (2010) examined students' communication during whole-group discussions and small group activities. Reissing-Vasile (2005) concludes that the small group discussions could be an effective vehicle for exploring meaning, deepening meaning, negotiating meaning, and making meaning effective while discussing literary texts.

To date there do not seem to be any studies which have addressed the issue of the effect of cooperative small group size and mode in computer-based environments on different language communication skills where the participants' identities were blinded or disclosed. This study aims to provide more evidence to clarify this issue. The results of the study may also help cooperative learning researchers take a more cautious step in designing cooperative learning groups in classrooms.

2. The study

This study investigated the effect of cooperative group mode, size and participants' identity status on the participants' achievement in communication skills (speaking and writing). It solicited to answer the following three research questions:

1. Are there significant differences between the groups of learners due to cooperative group mode (positive interdependence vs. individual accountability)?
2. Are there significant differences between the groups of learners due to cooperative group size (2- student group, 3-student group, 4-student group, 5-student group, and 6-student group, and 7- student group)?
3. What is the effect of disclosing/blinding the participants' identities while interacting around computers on their achievement in communication skills?

3. Method

3.1. Participants and design

The participants in this study consisted of 216 undergraduate general English language students at Al al-Bayt University in Jordan. The selection of general language students was due to two reasons. Firstly, it was possible to find a large number of students in the section (more than 54) which suits the design of the study, and secondly students do not take other language courses, which kept the whole groups as equal as possible in language proficiency. The participants' mean age was 19.31. All of them reported Arabic as their native language. The average number of years of prior formal English instruction was 12. All had received the majority of their formal English instruction in Jordan. The participants' communicative English proficiency could be characterized as beginner to pre-intermediate as determined by their grades in the English placement test in the Language Center in the university.

The study sample was randomly assigned to two major treatment conditions of cooperative learning mode: Positive interdependence and individual accountability. Then participants were randomly assigned to two identity status (anonymous and disclosed), and one of six cooperative group size (2–7 students); each category consisted of eight groups. All groups had a balance of high-medium-low achievement members based on their academic records in English language from the previous year. The Univariate Analysis of Variance run on pre-test scores found no statistically significant difference among the groups/conditions at the $p. < .05$ level; details on group mean scores on pre-test are indicated in Table 1.

3.2. Language activities and instructional treatment

Members of each of the cooperative groups worked in two-way. i.e., each group member needed to send and receive information, in both text and voice chat. Most of the activities were open tasks where students have more than one predetermined correct answer or small set of answers. All participants from the treatment groups were taught in computer-based environments. Each group was then asked to select a chairperson to coordinate writing and speaking sessions and facilitate discussion during those sessions. They were distributed on different size groups according to the treatment conditions, i.e., 2–7 student groups. They sat at different places in the classroom and interacted through the voice and text chat modules of the *NetOP* software (see Fig. 1) which was used in this study. Although they sat at the same place,

Table 1
Means and standard deviations of students' achievement on pre-test communication skills.

Group mode	Group Size	Identity/anonymous			Identity/disclosed			Sig.[a]
		N	Mean	SD**	N	Mean	SD[b]	
Positive interdependence	2 students	4	3.13	.95	4	3.25	.87	.11
	3 students	6	3.25	1.08	6	3.83	.52	
	4 students	8	3.63	.95	8	3.94	.94	
	5 students	10	3.75	1.09	10	4.00	1.31	
	6 students	12	3.42	.73	12	3.50	.71	
	7 students	14	3.47	.75	14	3.68	.75	
Individual accountability	2 students	4	3.00	1.08	4	3.13	.95	
	3 students	6	3.92	.59	6	3.67	.61	
	4 students	8	3.94	.73	8	3.75	.60	
	5 students	10	3.50	.75	10	3.90	.52	
	6 students	12	3.46	.87	12	3.92	.71	
	7 students	14	4.14	1.17	14	3.57	.83	
Total	Identity status	108	3.61	.91	108	3.72	.79	.31
	Individual accountability	N = 108; Mean = 3.72;SD = .82						.49
	Positive interdependence	N = 108; Mean = 3.60; SD = .88						

[a] The results are significant at the $p. < .05$ level.
[b] SD = Standard Deviation.

members of the groups whose identities were anonymous did not know each other while doing the tasks because they were given nicknames instead of their real names, a procedure adopted to reduce their anxiety from face-to-face discussions. However, the other students were instructed to write their real names, and their identities were disclosed.

Members of the cooperative learning positive interdependence groups worked together to complete a task. They were asked to arrive at a single product without assigning a role for each of them. This design allowed some of them to do nothing or everything. However, each member of the individual accountability cooperative group first worked on a task alone and then he/she told or showed the product to the group members, so each member was responsible for contributing his or her fair share to the group's success, which made it possible to avoid the problem of doing everything or nothing by certain group members. They had planned activities, which means that each student had time to prepare the task assigned for him/her before interacting with other group members.

The role of the teacher in the classes was mainly to set up the scene for the activities. He divided students into different size cooperative groups according to the treatment conditions of the study, which enabled them to chat together to perform a task though they sat at different places in the classroom. He also worked to ensure that each student had the opportunity to participate and explore. However, he provided the students with the help when they needed. He worked with groups to see difficulties, helped in negotiation and interaction, and monitored students' performance. He shared students' screens or keyboards, and scanned and kept watching what was happening on students' screens. When needed, he displayed his screen on the students' workstations. Moreover, he performed file transfer and distribution between students' workstations. Finally, he also established synchronous voice or text contact with selected student(s) without disturbing the rest of the class. Using this facility, the student could send a message to the instructor if he/she needed help.

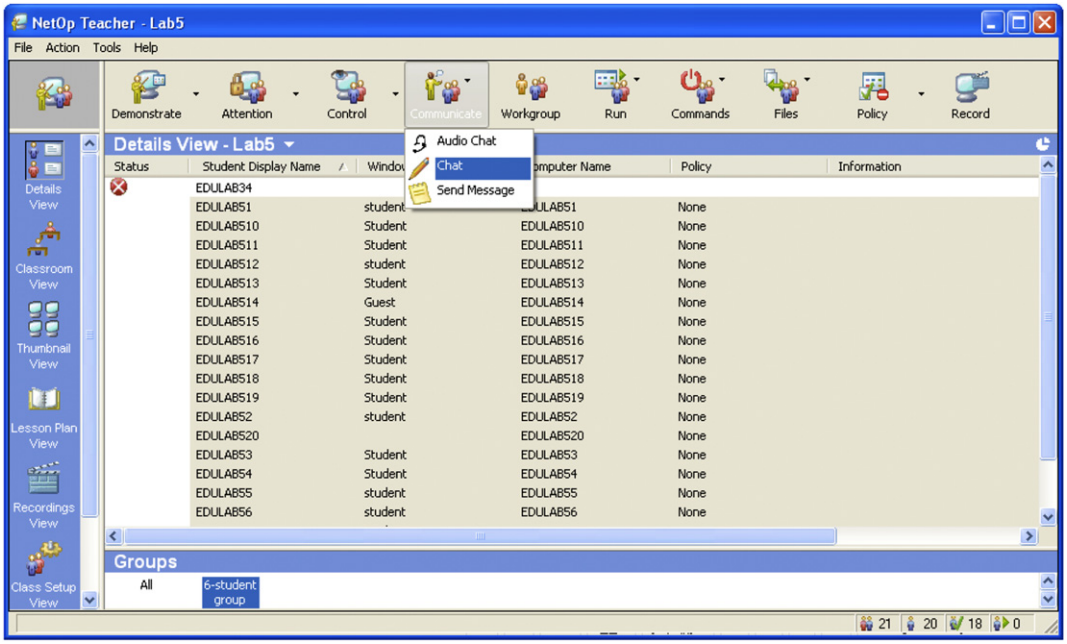

Fig. 1. NetOP Communication Module.

For the purpose of this study, several language tasks and activities including speaking and writing were designed. In the speaking activities, the instructor set the scene for the activity through explaining the title, asking questions, presenting difficult words, and relating the topic to students' life. The participants were instructed to talk about problems/difficulties that face them (see Appendix 1: List of Activities and Tasks). These topic tasks were used because they were related to students' life and experience, which made them attractive and enjoyable for students. Group members held a different portion of the information (e.g., problem description, causes, effects, and suggestions) randomly, and they were required to request and supply the information to each other so as to achieve the goal of task outcome. The participants used the voice chat to discuss the topic.

In the writing tasks, the cooperative groups used online text-based chat where each member of the group has an equal opportunity to participate in the chat. The students wrote eight essays (each 2–3 paragraphs, about 200 words) about the same topics they had discussed. Members of the positive interdependence groups worked together while on the computer to write the outline and the plan. They discussed main and supporting ideas and wrote a draft. They then revised and edited the topic and wrote an essay. However, each member of the individual accountability cooperative group first worked alone on each task while on the computers and they did not physically come together to work on the tasks; then the partners in the group worked together and checked for mistakes and errors, and provided suggestions and comments.

3.3. Tests

To find the effect of the experiment on the participants, a test was designed for this study. It consisted of two sections, speaking and writing. It was given to two raters (a native speaker and an EFL instructor who are specialists in applied linguistics) to check its suitability for the aims of the course, content, and clarity of instructions. Their comments and suggestions like modifying the speaking test scale and including a plan before writing the essay were taken into consideration. Each section was scored out of 10 by the two raters who were not told about the membership of students into the groups. Finally, the individual post-tests of speaking and writing were then aggregated into a single post-test out of ten, and the results were categorized and analyzed according to the different variables of the study.

The speaking section measures the participants' ability to produce acceptable level of clear spoken English. The speaking test was scaled to a range of 0–10 (9-10 = has full communicative competence; 7–8 = has almost full communicative competence; 4–6 = has partial communicative competence; 2–4 = has very limited communicative competence; 1–2 = has no communicative competence). Before the test, students were briefed about the components of the test and the assessment criteria. Each could select to speak about two situations (role-play and describe a problem) away from the class. The students were interviewed in pairs, and each had the chance to choose with whom they want to be intervened. The instructor interviewed the students meanwhile the two raters were assessing their performance from the control room. The inter-rater reliability was found to be .93 for this section of the test, which is acceptable statistically.

The writing section measures students' ability to write an essay in English, including the ability to plan and develop ideas, and supporting them with examples or evidence. Each student was required to write two an essay of 2–3 paragraphs (about 200 words) about the same speaking topics. This section was also scaled to a range of 0–10 (1–3 = coherent and clear ideas, 1–2 = correct grammatical rules, 1–2 = correct spelling, mechanics and organization, and 1–3 = effective use of vocabulary). Each of the two raters assessed 10 papers selected randomly, and disagreements were worked out through group discussions until they came to agreement. The inter-rater reliability was found to be .95 for this section of the test, which is acceptable statistically.

3.4. Procedure

Students were surveyed about their age, nationality, years of studying English, GPA, and studying other English language courses. They were then distributed randomly on different treatment conditions: group size (2-7 students), mode (positive interdependence vs. individual accountability) and participants' identity status (anonymous vs. disclosed); see Table 1 and Section 3.1. After the pre-test which found no statistically significant difference among the groups/conditions, each of the groups was taught according to the treatment conditions. That is, members of different size groups (2–7 students groups) worked cooperatively to do the different language activities in either the positive interdependence or individual accountability mode with their identities being anonymous or disclosed (see Section 3.2). All groups studied the same material, and they were taught by the same instructor. They studied in computer-based environment and seated at computer stations-one student per computer according to the computer-based instruction. Though they sit in the same classroom, they might hardly see or know each other. The program allows the instructor to divide them into cooperative groups who can chat together to perform a task via computer though they sit at different places. To keep the equality of the study experimental treatment conditions, an instructor with advanced computer expertise taught the classes. Students were told that their answers in the test would in no way affect their results in the course, and the study was just conducted for academic purposes.

Both activities (speaking and writing) lasted for 50 min once a week and extended over eight weeks. That is, the participants started discussing the topic; they then wrote an essay of two paragraphs about it in the same class. All groups spent the same time attending to the communication activities, and this did not vary across groups/conditions. Finally, each of the participants completed the same communication skill post-test.

Table 2
Means and standard deviations of students' achievement on post-test communication skills by group mode.

Group mode	N	Mean	SD[a]	df	F	Sig.*
Positive interdependence	108	5.32	1.18	1	30.68	.00
Individual accountability	108	6.31	1.51			

*The results are significant at the $p. < .05$ level.
[a] SD = Standard Deviation.

Table 3
Means and standard deviations of students' achievement on post-test communication skills by group size.

Group size	N	Mean	SD[a]	df	F	Sig.*
2 students	16	4.44	1.09			
3 students	24	5.29	1.10	5	21.33	.00
4 students	32	6.19	1.60			
5 students	40	7.18	1.34			
6 students	48	5.79	1.29			
7 students	56	5.39	1.04			

* The results are significant at the $p. < .05$ level.
[a] SD = Standard Deviation.

3.5. Data analysis

To address research questions, the Univariate Analysis of Variance was utilized. The descriptive statistics including means, standard deviations and the significance level of all groups on the pre- and post-test in cooperative learning group size (2–7 students group), mode (positive interdependence vs. individual accountability), and identity status (anonymous vs. disclosed) in communication skills (speaking and writing) were run. To find whether there were significant findings between these levels, the post hoc Schefe analysis was run. Participants' achievement in language tasks on post-test was the dependent variable while the independent variable was cooperative group size, mode and participants' identity status.

4. Results

This section will proceed in three major parts. The first concerns the cooperative group mode (positive interdependence vs. individual accountability). The second is the exposition of the cooperative learning group size (2–7 students). This is followed by the Post hoc analyses to show the significant differences by the group size. The third focuses on the effect of disclosing/hiding the participants' identities while interacting around computers on their post-test communication skills achievement. This is directly followed by the interaction results between cooperative group mode (positive interdependence vs. individual accountability), size (2–7 students groups) and participants' identity status (anonymous vs. disclosed).

The first question of the study focused on whether there were any significant differences between the learners groups due to cooperative group mode (positive interdependence vs. individual accountability). According to Table 2, the individual accountability mode significantly outperformed the positive interdependence mode on post-test communication skills. As the instructor worked to ensure that all students have the same opportunity to participate and explore, the main significant effect in learning communication skills by the sample in this study may be attributed to the individual accountability mode rather than the positive interdependence mode.

The second question of this study examined whether there were any significant differences between the groups of learners due to cooperative group size (2–7 students). Table 3 presents group size and achievement on the post-test. Based on the findings in the table, it can be concluded that the 5-student group gained the highest means. It was followed by the 4-student group, the 6-student group, and then the 7-student group. However, the lowest mean was for the 3-student group and the 2-student group. All these findings were significant at the $p. < .05$. In order to find the significance level between the different groups, the Post hoc analyses were run. Table 4 shows that the 5-student group significantly outperformed all other groups. Similarly, there were significant findings between the 2-student group and the 4-student group and the 6-student group, in favor of these groups. However, there were no significant differences between the 2-student group and the other groups which contained 3 and 7 students, and between the 3-student group and the groups with 4, 6 and 7 students. Finally, the findings of the study produced insignificant differences between the 6-student group and the 7-student group. As groups had the same treatment conditions and opportunities for participation and interaction except the different group size, it can be concluded that the main significant effect here is attributed to the group size.

The third question of this study concentrated on the effect of disclosing/hiding the participants' identities while interacting around computers on their post-test communication skills. Table 5 illustrates the findings related to the participants' identity status (anonymous vs. disclosed). The table reveals that the groups whose identities were anonymous while interacting around computers significantly outperformed those whose identities were not. As the two groups had the same treatment conditions except students' identity status (anonymous vs. disclosed), it can be inferred that the large significant effect on the EFL learners' communication skills achievement in computer-based environments may be attributed to blinding the participant's identity. Finally, there was no interaction between cooperative group mode (positive interdependence vs. individual accountability), size (2–7 student groups) and participants' identity status (anonymous vs. disclosed) at the $p. < .05$ level as shown in Table 6.

Table 4
Schefe post hoc test (multiple comparisons) on communication skills post-test.

Group size	2		3		4		5		6		7	
	MD	Sig.	MD	Sig.	MD	Sig.	MD	Sig.	MD	Sig.	MD	Sig.
2			−.77	.46	−1.75(*)	.00	−2.74(*)	.00	−1.35(*)	.00	−.96	.10
3	.77	.45			−.98	.06	−1.97(*)	.00	−.58	.48	−.19	.99
4	1.75(*)	.00	.98	.06			−.99(*)	.02	.40	.77	.79	.06
5	2.74(*)	.00	1.97(*)	.00	.99(*)	.02			1.38(*)	.00	1.78(*)	.00
6	1.35(*)	.00	.58	.48	−.40	.77	−1.38(*)	.00			.40	.63
7	.96	.10	.19	.99	−.79	.06	−1.78(*)	.00	−.39	.63		

* The mean difference is significant at the .05 level.

Table 5
Means and standard deviations of students' achievement on post-test communication skills by participants' identity status.

Identity Status	N	Mean	SD[a]	df	F	Sig.*
Anonymous	108	6.09	1.49	1	9.15	.00
Disclosed	108	5.58	1.39			

* The results are significant at the $p < .05$ level.
[a] SD = Standard Deviation.

Table 6
Tests of between-subjects effects.

Source	Type III sumof Squares	df	Mean square	F	Sig.
MODE × SIZE × IDENTITY	31.207	16	1.950	1.631	.06

5. Discussion and conclusion

The findings of the study revealed that the cooperative learning individual accountability mode obtained higher significant mean scores than the cooperative learning positive interdependence mode. This seems to be due to the fact that using this technique has many advantages compared to the positive interdependence mode. Using this technique enables each group member to play his/her role within the group. Each student is asked to work alone first and then discuss or compare answers with other group members. Therefore, each student should play a role and contribute to the group's success. In this way, no one can dominate the discussion or do everything, which may discourage other members of participation. This mode may also motivate every group member to share because the mechanism of assigning roles for each member provides an equal opportunity for all partners to participate. It enables every student to bear responsibility for his/her own learning with his/her peers. It prevents some group members to work for others and do their tasks. It does not also allow any member to do nothing and wait for others to do the task. The shy, retiring student who does not perform his/her task may be embarrassed when he/she is asked to play his/her role and does nothing, which may motivate him/her to exert more efforts to perform the task assigned to him/her. This finding seems to be in line with Long's (1990) suggestion that planned tasks when students have time to prepare the language they are going to use before interacting with other group members are functional for enhancing language learning.

However, the other technique, the positive interdependence mode, might be unfair for some students. It could be an ideal mode for extrovert students, but this seems to be on the account of the other group members who are reluctant to share, or make glaring errors whenever they speak or write. Senior (1997) reported that it is quite easy for any teacher with a large class of language students to ignore the quiet, shy individuals who do not make demands on them. This mode of cooperative learning might promote an atmosphere of individualism, competition rather than cooperation and equity. Moreover, the task performed by the group might not be a product of the collective efforts of every single group member. Some students may not participate, and so the final group product does not represent the contribution of all members fairly. This may create conflicts for both students and instructors. For example, some students would have preferred to submit individual assignments. Boughey (1997) referred to this problem and pointed out, "Although it is undoubtably true that some students were disadvantaged by the mark assigned to the group assignment, while others benefitted, experience suggests that it would have been possible to mediate this mark in order to achieve a more accurate assessment of individual development" (p. 133).

The results of the study indicated that the 5-student group significantly outperformed other groups of two, three, four, six, and seven members on the post-test communication skills. In a pair, one student is speaking/writing while the other is listening/reading, with limited chances for benefiting from other classmates or interacting with them. In a group of three or four, a student is listening/reading and the other two or three are listening/reading or formulating responses. The members of these groups also have a limited chance to benefit from other classmates. However, the student might have more chances to interact and benefit from the group-mates in the 5-member group than these groups where he/she has a chance to listen to or benefit from up to four group-mates. It was also found that the bigger the group size is, the higher the performance of its members is; however, this is valid only to groups consisting of 2–5 students, and the 6 and 7-student groups were exception. There were no significant differences between the achievement of these groups and the 3-student and 4-student groups, and the 5-student group significantly outperformed them. This finding was unexpected. Probably, the number of the students in the groups of six and seven students is too large that there is no chance for all members to share and express themselves, especially if we take into consideration the limited time for each task. The large number of students might have caused anxiety to the speakers and hampered interaction despite the fact that the participants in all groups of different size had the same opportunities to interact. Maybe some outgoing students from the positive interdependence group dominated the discussions and discouraged other members in this group to perform their tasks. Also, it could be that some of the group members whose identities were not blinded were reluctant and afraid to talk or share. However, these possibilities are just speculations because all groups in the different conditions were treated equally. Therefore, all these speculations could be tested in other studies to investigate their effects.

However, Owston et al. (2009) reported different findings. They found that teachers who implemented the heterogeneous groups of two or three students found it a novel way to teach. This is not also in agreement with Kagan (1992), and Gude and Nolasco (1991) who recommended the group of four students. They found that pairs who worked on a task and then compared their answer with another pair working on the same activity could work well. Similarly, Jacobs and Ball (1996) reported different results. They investigated the structure of group activities and found that the small number of members recommended for most group activities points to the working in pairs or groups of three or four students. However, most of these studies were conducted on groups of only 2–4 students. Also, most of them did not investigate the phenomenon as a piece of research in which the group size of 2–7 students variable was investigated as a major treatment condition as it is in this study.

It was found that the anonymous participants' identity status produced a higher significant difference than the disclosed status. This means that when the identities of the participants are blinded, they have higher mean scores than when they are revealed. This seems to be logical in the light of certain points. The participant may be worried and anxious from the face-to-face debate, especially when he/she interacts in foreign language classes. He may be afraid of making mistakes or shy. One of the benefits for computer-based instruction includes (Bruce et al., 1993) greater participation by different groups of people in subordinate positions such as shy students. In this study, the 'electronic secret pals' technique was used where students were blinded about the identities of each other. The use of computer-based instruction might make learners who were shy, passive and afraid to speak in foreign language classes less worried and encouraged them to participate. AbuSeileek (2007) observed that blinding the students' identities or giving them numbers instead of names to ensure anonymity in computer-based environments would reduce their anxiety that stem from face-to-face cooperative debate. Similarly, González-Bueno (1998) noted that computer-based instruction gives students opportunities to develop conversation-like language which they could not develop in other situations for reasons of shyness and/or fear of making mistakes in an atmosphere of spontaneity.

The use of the computer-based environment enables the users to conceal their identities; other face-to-face situations do not allow the user to blind his/her identity while debating. Ma (1996) argued that students might be more direct and more open in computer-based classes than they would be in face-to-face contexts. Thus, the lack of face-to-face contact in this study may reduce the possibility for a loss of face, which may occur in a classroom if the student makes inappropriate linguistic or social behavior. It is widely believed (Sullivan & Pratt, 1996; Warschauer, 2000) that participants feel less anxious or shy in computer-based environments.

One of the limitations of the study is related to the sample of the study. The results are applicable to EFL learners who are beginner to pre-intermediate in language proficiency. Therefore, there is a need for conducting more studies on other groups of EFL learners, ESL learners or native speakers. Another limitation is related to the group size. Here, groups of only 2–7 students participated in this study. For this reason, there is a need for conducting more studies on larger groups of eight students or more, or whole class interaction. Similarly, another study might be devised on individual students to compare their performance with larger groups. There is also a need for another study to compare the effect of the cooperative learning group size and modes on different language skills and areas, such as listening and reading. Moreover, this study explored many variables related to the effect of cooperative learning small group size (2–7 students) using two different instructional modes (positive interdependence vs. individual accountability) on EFL undergraduate learners' whose identities were disclosed/blinded while interacting around computers.

In conclusion, the findings of this study bring us a step closer to understanding the technique of cooperative language learning. The larger the size of the group is, the higher the achievement is, with one exception, the groups of six and seven students. Similarly, conducting the study in a computer-based environment enables the instructor to make arrangements to blind the identities of the participants. The introduction of this option makes it very helpful to reduce the anxiety the participants may face during face-to-face debate. "Overall, technology turned out to be an important factor shaping the collaborative relationships observed in the classroom and, consequently the learning opportunities available to students" (Jeon-Ellis, 2005, p. 140). The use of the individual accountability mode was quite useful compared with the positive interdependence mode as it assigns each group member a role and has a mechanism for sharing and performing the role significantly. Otherwise, some of the group members may do nothing or everything, and thus discourage the other members from participating or sharing.

Appendix 1. List of activities and tasks

Instructions for each topic.
Write an essay of 2–3 paragraphs (about 200 words) about the following topic:
Students took the following eight speaking/writing activities/tasks:

1) What are the difficulties that face you in the university?
   The following may help you: Transport, fees, place of lectures, textbooks, providing services (food, library, bookshop, etc.), schedule, etc.
2) Using the Internet by the student.
   The following may help you: What are its dis/advantages? Negative/positive effects, how did you get rid of the disadvantages/bad effects? Give suggestions for using the Internet usefully.
3) Spending spare time.
   The following may help you: How do you spend your spare time? What/Why/With whom/When/Where do you do/…? What are the negative/positive effects of spare time? Give suggestions for spending spare time usefully.
4) Family problems.
   The following may help you: Parents respect vs. personal freedom, how do parents deal with their children? Do they interfere in their future decisions such as marriage and what to study? Why? What are your reactions? How did you solve the problem? Suggestions for solving the problem.
5) A problem you had with a friend.
   The following may help you: What happened? Why? With whom? When? Where? Results, and how did you solve the problem?
6) Difficulties facing students in English language learning.
   The following may help you: Problem description, causes, and suggestions for solving the problem.
7) Cultural differences.
   The following may help you: What does culture include? How do cultural differences (e.g., in values, habits, etc.) affect you? Cultural dialog, and suggestions to deal with cultural differences.
8) Violence at the universities.
   The following may help you: Problem description, causes, effects on students/the society, and suggestions for solving the problem.

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