Research Paper

Exploring the Impacts of Brainstorming-Based Collaboration on the Speaking Ability of Iranian EFL Learners and EFL Teachers' Attitudes Toward Using This Technique: A Mixed-Methods Approach

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Abstract
This study used a mixed-methods approach to investigate the impact of brainstorming-based collaboration on the speaking performance of 63 undergraduate male EFL learners at Naval Science and Technology University in Iran. The students were homogenized and divided into experimental and control groups. The experimental group received instruction that incorporated brainstorming sessions, while the control group was taught using conventional methods. After 20 sessions of treatment, paired t-tests were performed on pretest and posttest scores. The study found that the experimental group's speaking skills were positively affected by the use of brainstorming techniques. Investigators conducted a semi-structured interview with 20 English language teachers to gather their opinions and attitudes about the use and effectiveness of brainstorming strategies. Qualitative analysis of the teachers' evaluations revealed that the use of brainstorming strategy enhances students' speaking skills proficiency and boosts instructors' positive attitudes toward language teaching and learning. The study suggests that English language teachers should incorporate brainstorming strategies into classroom activities and that textbooks could be developed with brainstorming principles.

Key Words: speaking, brainstorming, teacher attitudes, Brainstorming-Based Collaboration

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Introduction

English language teachers have always been concerned with improving EFL/ESL learners' proficiency levels, particularly in speaking skills. Teachers strive to facilitate the integrated learning of language skills and concepts within meaningful contexts, but they face challenges in selecting appropriate strategies to stimulate learners' imaginations and engage their minds effectively. One reason, learners struggle with speaking is due to their lack of background knowledge and inability to think creatively. The technique of motivating learners to use the target language has been controversial and researchers have explored different methods to improve learners' speaking skills. Brainstorming is one such strategy that motivates thinking and helps learners focus, retrieve, synthesize, and organize their opinions. The available literature suggests that brainstorming can enhance language skills and contribute to students expressing ideas (Wu, 2016). This study focuses on the brainstorming strategy and its potential to improve EFL/ESL learners' speaking skills. The anticipated outcome of this research is that English language teachers can use the findings to enrich their teaching environment and foster students' enthusiasm for learning to speak.

Statement of a problem through brainstorming activities motivates thinking and as a result, learners have to focus, retrieve, and organize their opinions. The available literature on this subject indicates that numerous studies have explored how brainstorming can contribute to the enhancement of language skills. According to Richards (1990), brainstorming strategy contributes to the students expressing ideas and will enhance the learners' cognitive skills. Imane (2016) contended that speaking as an interactive process of communication, especially for EFL learners, is the most interesting skill, to the extent that he believes that if a person can speak a language, she/he knows that language. Thornbury (2012) states that just saying a few sentences with correct grammatical structure does not mean mastery of speaking skills. The ability to speak a language is an interactive skill that requires the speakers of that language to have the ability to understand all contextual conditions and cooperate in managing speaking turns. According to Lado (1977), speaking skill is the ability to verbalize what one has in his/her mind or the ability to express sequential ideas fluently in real contexts. Therefore, the most important task of an English teacher in teaching speaking skills is to encourage learners to freely express their ideas and feelings about the topic of discussion, and to motivate them to participate in continuous contextual exercises through cooperative learning strategies. That's why the researchers applied the brainstorming strategy to investigate if there is a significant impact on the enhancement of speaking skills; as a rule, during

brainstorming sessions, participants and especially the teacher should avoid criticizing ideas or rewarding the speakers for their ideas.

According to Gholami and Birjandi (2021), English language learners in Iran often lack sufficient exposure to authentic spoken language and interaction, as they are primarily exposed to written language and formal education-oriented methods. For language learners, this can lead to difficulties in expressing themselves in speaking tasks. The authors suggested that incorporating authentic materials in the classroom and promoting learner-centered activities can be effective strategies for developing EFL learners' speaking skills. Borg and Al-Busaidi (2020) believed that the amount and quality of teacher talk in second-language classrooms can significantly impact language learning outcomes. They argue that teacher talk should be purposeful and supportive of learners' needs, and should create opportunities for learners to engage in meaningful interactions with each other. This is in contrast to Alfi, (2015) believed that the amount of time teachers spend talking in the classroom contradicts the social nature of learning, indicating that the teacher should not be the sole contributor in the learning process; in other words, excessive teacher-talk-time goes against the collaborative and interactive nature of learning, suggesting that students should have a more active role in the classroom, and according to Probst (2007) "it's the student who should be doing most of the work" (p. 43);

because it is the students who are going to learn language.

Speaking skills are considered boring activities for both teachers and learners if they concentrate only on learning the language form as the final product. To overcome this, students should actively get involved in the spoken skills activities through brainstorming strategies to make the situation as much interesting as a natural context through which they can enhance their language skills and sub-skills subconsciously.

Brainstorming is a very useful tool that can help learners to create ideas successively. It is assumed that teachers are skilled in creating a situation where learners are thinking about the topic of discussion (not to deal with grammar, vocabulary, and other language issues) while speaking to help them improve their native-like fluency. According to Soleimani and Taheri Mahmoudabadi (2013), in TBLT-based approaches, the mind of the language learner is free from language control, and language learning in this method develops naturally and is similar to learning their mother tongue.

Long (1983), Nunan (2006), and Ellis (2017) argued that teaching and learning a language through a brainstorming-based technique, which underlies a task-based language teaching approach, contributes to language learners learning the language by interacting with their peers through performing tasks and focusing on the very message instead of the language form.

Storch (2005) revealed that group work will result in opinion sharing among group members. McDonough (2004) also stated that collaborative group discussion leads to decreasing the level of anxiety in language learners. According to him, communication opportunities can be provided by performing such exercises. Mahmoud (2014) as well, believed that collaborative tasks trigger a meaningful and comprehensible instructional situation leading to sharing of opinions and knowledge. In another study Johnson et al. (2000) revealed that cooperative learning tasks potentially promote social relations and enhance learning. O'Donnell et al. (1985) stated that collaborative group work will foster a positive interactional environment. Hirst and Slavik (2005) argued that collaboration leads to producing opinions. Richards and Rodgers (2001) contended that cooperative learning develops communicative competence. Consistent with all the above mentioned, Kim (2006) revealed that Cooperative Learning leads to higher learning achievement and motivation. And according to Al-Sohbani (2013), Cooperative Learning significantly enhances the spoken ability of learners. Routman (2005) as well noted, "Students learn more when they can talk to one another and be actively involved" (p. 207).

As long as, teaching speaking is a challenging task for language teachers, they must find effective methods to facilitate students' improvement in speaking proficiency. Traditional-method-based classes is problematic and boring for learners, that makes them difficult for teachers to handle (Khodadady et al., 2011). Although most foreign language teachers have been aware of learners' speaking problems for a long time and have tried to provide opportunities for natural communication in their classrooms (Hamzah et al., 2010); however, motivating and persuading learners to speak in English is not an easy task. To address this issue, the authors of this study sought to investigate the potential benefits of implementing brainstorming activities to enhance language students' conversational abilities in English. The study aimed to compare the effectiveness of brainstorming techniques with conventional approaches in developing speaking skills as well as to gather the attitudes of EFL teachers towards implementing brainstorming strategies in English language classrooms. The investigators also aimed to determine whether brainstorming-based activities have an impact on language learners' speaking abilities. Reviewing the literature, the authors found that few studies have investigated the effects of brainstorming on speaking skills (Budiarti, 2016; Khodadady et al., 2011). Therefore, a more comprehensive investigation of this issue was needed. In addition to the quantitative component of the study, the authors conducted a qualitative exploration of brainstorming strategies by conducting semi-structured interviews with twenty English

language teachers to gain insights into their attitudes towards implementing these strategies in the classroom.

To attain the objectives of this study, the subsequent research inquiries were formulated:

1. Is there any significant difference between the students' speaking mean scores receiving traditional methods of teaching and the students' speaking mean scores receiving brainstorming strategies?

2. Does the use of brainstorming strategies significantly affect students' speaking proficiency levels?

3. What are the attitudes of the EFL teachers towards applying brainstorming strategies in English language classrooms in Iran and the effectiveness of these strategies in improving learners' speaking proficiency level?

Review of the Related Literature

Theoretical Considerations

According to previous research, brainstorming can enhance collaboration and authenticity for English as a Foreign Language (EFL) students. However, there is limited research on the effects of brainstorming techniques on spoken skills. In natural language learning environments, receptive and productive skills are interrelated, presenting challenges for both learners and teachers. Shumin (2002) notes that speaking skills encompass more than just linguistic components and require addressing other factors. Contextual issues are an important consideration when developing speaking skills in a language. According to Chastain (1988), speaking in a specific language involves more than just knowing the linguistic components of that language, and developing language skills requires addressing contextual factors such as learners' attitudes, expectations, interests, and needs. These issues are interrelated and should be considered when establishing the objectives of a speaking course, which has received significant attention in recent years (p. 270). Brainstorming sessions are effective in promoting creative thinking among group members, inspiring numerous "free associations," and eliminating negative criticism that obstructs the visualization of ideas (Hayes, 1940; Osborn & Veigel, 1949; Jossey, 1998). To make brainstorming sessions more productive and effective, guidelines such as ruling out criticism, deferring judgment, and combining and improving ideas are essential (Isaksen, 1998; Smith, 1998; Osborn as cited in Isaksen, 1998). Additionally, cooperative learning methods such as group discussion or brainstorming techniques have been found to promote intrinsic motivation among EFL learners (Ziafar & Namaziandost, 2019). Abdullahi (2015) noted that brainstorming is a useful strategy to foster communication skills, thinking, and decision-making skills, and the exchange of multiple views and opinions in different fields of

learning. In this technique, the transactional communication flow among all group members forms the basis of the learning process instead of the dialogue between the students and the instructor. However, this technique may not be appropriate for younger or less proficient students who lack the necessary reasoning skills to participate effectively.

Wilson (2013) emphasized the importance of avoiding both criticism and praise during brainstorming sessions to compile ideas from inhibited participants. Free listening through interactive activities can enrich students' background knowledge, enhance their confidence and speaking performance, and jolt them out of their normal ways of thinking. By creating a relaxed and informal situation, brainstorming can help students become unstuck and generate new ideas. Therefore, it is recommended not to criticize the ideas presented in brainstorming sessions (Sinha as cited in Wilson, 2013). Overall, speaking skills and effective brainstorming techniques are critical components of language learning that can enhance learners' motivation, creativity, and social interaction. Nasri and Biriya (2017) and Pattanpichet (2011) reported that most of the studies conducted show that the cooperative learning methods create a positive attitude of teachers and learners towards the use of these methods and their positive effects on speaking skills have been proven. Elsewhere,

Tahmasbi et al. (2019) mentioned that cooperative learning methods have positive results on language learners' performance due to the presence of social interaction between students. Mackey (2007) also claimed that social interaction contributes to the overall language development of learners. Namaziandost et al. (2019) in their study observed that learners, who interact in the classroom, achieved better oral skills than those who always keep silent. If we accept that brainstorming underlies Student-Centered Learning (SCL) we can conclude that according to Unin and Bearing (2016), it encourages language learners to have an active function in the process of language learning and development. In other words, SCL is an open-ended sharing activity, usually done in groups to encourage active participation. Then, the characteristics of the atmosphere created in the brainstorming-based contexts help us to approach this SCL.

Empirical Studies

Numerous studies have investigated the impact of using brainstorming techniques on the language proficiency level of EFL learners. A study by Torky (2006) aimed to investigate the effectiveness of a task-based instruction program in developing the English language speaking skills of secondary stage students. The study used a quasi-experimental design with a pre-test

and post-test. The experimental group received instruction that included communicative tasks such as brainstorming, problem-solving, and project activities. The study found that the experimental group showed significant improvement in their speaking skills compared to the control group, indicating that communicative tasks were effective in developing students' speaking skills. Al-Bwli (2006) discovered that there was a noteworthy distinction between the study groups, which can be attributed to the technique used for teaching creative thinking. Houston (2008) found that brainstorming and creative problem-solving activities can foster the learners' creativity and improve their fluency in speaking. Hsu (2010) has found that brainstorming can have a positive impact on the quality and creativity of writing in language learners. The author found that Taiwanese EFL college students who engaged in brainstorming produced higher-quality writing and had increased self-efficacy.

The attitudes of EFL teachers toward using brainstorming-based collaboration have also been explored in previous studies. Some studies have reported that EFL teachers may encounter challenges when using brainstorming-based collaboration in their teaching. For example, Al-Mekhlafi and Nagaratnam (2011) reported that Malaysian EFL teachers faced difficulties in implementing brainstorming techniques due to a lack of training and resources. Al-Jarf (2012) found that Saudi EFL teachers had a positive attitude toward using brainstorming techniques in their teaching. Similarly, Al-Qahtani (2013) discovered that Saudi EFL teachers believed that brainstorming activities could enhance students' critical thinking, creativity, and speaking abilities.

Zarif and Mateen (2013), Emami Rizi et al. (2013), Abdullahi and Mohammad (2015), Alshammari (2015), Unin and Bearing (2016), Budiarti (2016), Hidayanti et al. (2018), Namaziandost et al. (2019), Al Masri (2019), Oniye et al. (2020), and Octarina et al. (2021) also researched the effectiveness of using brainstorming techniques in enhancing language proficiency. The studies used various measurement tools and techniques and found that the implementation of brainstorming activities had a positive impact on learners' creative thinking, motivation, self-confidence, reflective thinking, and oral proficiency skills.

Nijstad et al. (2020) conducted a comprehensive review of the literature on brainstorming and its role in creative problem-solving. They found that brainstorming can be an effective technique for generating a large number of ideas and increasing the creativity of individuals and groups. However, the effectiveness of brainstorming can be influenced by factors such as group size, task complexity, and the presence of social inhibition.

Recent research, such as the comparative study by Kavaliauskiene and Zukauskiene (2021), has found that brainstorming activities can be an effective technique for developing speaking skills of language learners. The authors found that learners who participated in brainstorming activities showed significant improvements in their speaking proficiency and fluency, and produced more efficient ideas compared to the control group.

The results of a study conducted by Rahman and Khan (2021), showed that the use of brainstorming techniques can have a positive impact on language learners' self-confidence in speaking. The authors found that EFL learners who participated in brainstorming activities showed significant improvements in their self-confidence participating in English conversations. This supports the research by Fitriah et al. (2022) who conducted a study to examine the effects of the brainstorming technique on students' self-confidence in speaking English. They found that the use of brainstorming techniques improved students' self-assurance in participating in English conversations within the classroom setting. The study used qualitative research methods and collected data through interviews, observations, and documentation. Overall, the findings suggested that the use of brainstorming techniques can be an effective way to enhance students' self-confidence in English speaking skills.

In summary, the literature suggests that the brainstorming technique can be an effective content-based teaching approach that fosters learners' creativity and language proficiency by encouraging interaction, idea generation, problem-solving, and project-based activities. The technique can be applied in various settings and with different age groups and may lead to improved language skills in authentic situations. However, EFL teachers may face challenges in implementing this technique in their teaching. Therefore, this empirical study aims to explore the impacts of brainstorming-based collaboration on Iranian EFL learners' speaking ability and EFL teachers' attitudes toward using this technique. By using a mixed-methods approach, this study aims to provide a more comprehensive understanding of the potential benefits and challenges of using brainstorming-based collaboration in EFL classrooms. The findings of this study can contribute to improving the teaching and learning of English language skills in Iranian EFL classrooms and can also inform EFL teachers on the effective use of brainstorming-based collaboration in their teaching practice.

Method

The study was carried out as a qualitative work and an applied

work in terms of the objectives. The study method was inductive qualitative through content analysis based on Attride-Stirling's approach. The study was performed in three steps. The study method is based on a theme network, which is widely used in research projects. The theme network contains three sets of codes and concepts including basic themes, organized themes, and comprehensive themes (Gholizade et al., 2021).

The potential participants were experts in the educational management field in Fars Province with at least 10 years of experience in vocational schools. In addition, academic community members and those in Farhangian University (specialized in training school teachers) who had a published book or paper in this field were included. Sampling was done through purposive sampling. After determining the sample size, 32 individuals were interviewed through a semi-structured interview (20 men and 12 women including nine university professors and the rest were experts, students, and school principals and deputies). The interviews were stopped when theoretical saturation was realized, which was achieved with 28 interviews and the interviews continued up to 32 interviews. All the interviews in the qualitative phase were semi-structured interviews.

The research tool was semi-structured interviews without time limitation so that on average, the interviews took 40 to 70 mins. After the interviews, the theoretical ground study and document review were carried out based on a content analysis strategy. The patterns in the qualitative data were identified and along with designing the content frame and network, content analysis was carried out. To make sure of the credibility of the results, coding was done by two experts and to make sure of consistency between the coders, the interviews were performed with different groups (university and higher education institutes professors, experts, students, and school principals and deputies with at least 10 years of experience). As for transferability of the results, interviews were conducted with 32 experts and to observe neutrality (confirmability) all details were recorded. Two checking methods including participants check and non-participating expert checks, were used in the study.

Results and Discussion

The study used a mixed-methods approach to investigate the effect of brainstorming on the speaking skill of Iranian language learners. The researchers collected data from 63 Iranian undergraduate male cadets at Naval Science and Technology University in Rasht, Gilan, who were pursuing majors unrelated to English. The participants were divided into an experimental group and a control group, and all were new to brainstorming strategies. The experimental group received instruction that incorporated brainstorming sessions, while the control group was taught using conventional methods. The study relied on both quantitative data and

qualitative data. The qualitative data was collected through semi-structured interviews with English language teachers. The convenience sampling method was used to select participants from the university.

The investigators used a multiple-choice placement test from Pearson Longman ELT to select participants with similar proficiency levels and assess their homogeneity. Standardized oral pre-and post-tests were also conducted by the Iran Language Institute to evaluate the impact of the brainstorming strategy on the speaking proficiency of the participants. To enhance reliability, the researchers worked with two other English instructors and reached a consensus on evaluating the test content and procedures. On the other hand, to enhance the validity of the study, the researchers used a pilot study to test the instruments, using established measures of the constructs being studied, and ensuring that the study design and procedures align with established research practices in the field. Evaluation standards for the speaking tests were developed by Ur (2006) in Table 1, which emphasizes both fluency and accuracy aspects in oral assessments.

Table 1- The Specifications for the Speaking Skills Test

Accuracy	Score	Fluency	score
Little or no language production	1	Little or no communication Very hesitant and brief	1
Poor vocabulary, mistakes in basic grammar, very strong foreign accent	2	utterances, sometimes difficult to understand	2
Adequate but limited vocabulary makes obvious grammar mistakes, a slight foreign accent	3	Gets ideas across, but hesitantly and briefly	3
Good range of vocabulary, occasional grammar slips, slight foreign accent	4	Effective communication in short turns	4
Wide vocabulary appropriately used, virtually no grammar mistakes, native-like or slight foreign accent	5	Easy and effective communication uses long turns	5

As well as the above-mentioned instruments, a semi-structured interview designed by the investigators was also administered to twenty English language teachers to collect their main ideas and attitudes towards using and the effectiveness of brainstorming strategies in L2 classes.

Data Collection and Analysis Procedure

The researchers used quantitative and qualitative methods to compare the effectiveness of brainstorming as a technique

for enhancing the speaking skills of Iranian EFL learners. They divided participants into an experimental and control group and implemented a three-month program, with the experimental group using brainstorming while the control group used traditional methods. The intervention was led by the same English teacher for both groups. Participants were assessed through a multiple-choice placement test and a speaking posttest. The researchers also administered a semi-structured interview to 20 EFL instructors to investigate attitudes toward using brainstorming strategies and their effects on language learning. The study was conducted with homogenous participants in terms of language proficiency, gender, accommodation arrangements, social class, classroom situation, and motivation.

This study utilized a mixed-methods approach, involving both quantitative and qualitative aspects in the design, data collection, and analysis. The pre-and post-test scores were analyzed using SPSS software to determine the effectiveness of brainstorming strategies in improving the speaking proficiency of Iranian EFL students. Descriptive and inferential statistics were used, along with semi-structured interviews to analyze the attitudes of teachers toward brainstorming strategies. The results of the interviews were content analyzed to obtain subjective responses from the teachers.

Results
Quantitative results

The tables provided, illustrate the impacts of brainstorming-based collaboration on the speaking ability of Iranian EFL learners. In particular, the research questions focused on whether there is a significant difference between the speaking mean scores of students receiving traditional methods of teaching and the speaking mean scores of students receiving brainstorming strategies, and whether the use of brainstorming strategies significantly affects students' speaking proficiency levels.

Table 2 presents descriptive statistics for the pre-test and post-test scores of the control group (CG) and experimental group (EG). These statistics provide important information about the distribution of scores in each group, such as the mean, minimum, and maximum scores, as well as the standard deviation.

Table 2- Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
pre-test of speaking for CG	32	10.00	15.00	13.0391	1.37973
post-test of speaking for CG	32	11.00	17.00	14.0078	1.45287
pre-test of speaking for EG	31	10.00	16.25	12.5081	1.54311

post-test of speaking for EG	31	14.00	19.50	16.4597	1.35569
Valid N (listwise)	31				

Table 2 shows that the mean score for the pre-test of speaking for the CG was 13.0391, with a standard deviation of 1.37973, while the mean score for the pre-test of speaking for the EG was 12.5081, with a standard deviation of 1.54311. This indicates that the two groups had similar scores on the pre-test, with the CG having a slightly higher mean score and a slightly lower standard deviation. The mean score for the post-test of speaking for the CG was 14.0078, with a standard deviation of 1.45287, while the mean score for the post-test of speaking for the EG was 16.4597, with a standard deviation of 1.35569. This indicates that both groups showed improvement in their speaking skills after the intervention, with the EG showing a larger improvement than the CG. As the table compares the performance of the two groups, and illustrates that there was a significant difference in the speaking ability of the EG group before and after the intervention. However, it's important to keep in mind that these statistics are based on a single study and may not be generalizable to other contexts. It's also important to note that the Valid N (listwise) is 31, meaning that 31 participants completed all of the pre-and post-tests and were included in the analysis.

Table 3 provides group statistics for the pre-test and post-test scores of both groups, including the mean, standard deviation, and standard error mean. These statistics provide detailed information about the performance of each group and identify the trends or patterns in the data. The table shows that the mean score for the pre-test was slightly higher for the CG, with a mean of 13.0391 and a standard deviation of 1.37973, compared to the EG, which had a mean of 12.5081 and a standard deviation of 1.54311. The standard error of the mean was also slightly different for the two groups, with the CG having a standard error of .24390 and the EG having a standard error of .27715. This suggests that the CG had a slightly higher level of speaking ability at the beginning of the study. After the intervention, the mean scores for the post-test were noticeably different between the two groups. The CG's mean score increased to 14.0078, while the EG's mean score increased to 16.4597. This indicates that the intervention had a greater positive effect on the EG's speaking skills than on the CG's skills.

Table 3- Group Statistics

	CG and EG	N	Mean	Std. Deviation	Std. Error Mean
pre-tests of both groups for Sp	CG	32	13.0391	1.37973	.24390
	EG	31	12.5081	1.54311	.27715

post-tests of both groups for Sp	CG	32	14.0078	1.45287	.25683
	EG	31	16.4597	1.35569	.24349

Moreover, the standard deviation for the post-test scores of the EG was much lower than that of the CG, indicating that the intervention had a more consistent effect on the EG's scores than on the CG's scores. The standard error of the mean was also lower for the EG than for the CG in both the pre-and post-tests, suggesting that the sample size was large enough to provide a reliable estimate of the population mean for both groups.

Overall, Table 3 provides valuable information about the pre-and post-test scores for the Speaking task in both the CG and EG. The data suggest that the intervention had a greater positive effect on the EG's speaking skills than on the CG's skills and that the effect was more consistent across the EG group. The results of this study suggest that the intervention used in this study was effective in improving the speaking skills of the experimental group.

Table 4 illustrates the results of the independent samples t-test for the pre-and post-tests of speaking skills for the control group (CG) and experimental group (EG). It provides important information about whether there are any significant differences in the speaking ability of the two groups before and after the intervention. The table shows that for the pre-test of speaking, the t-value was 1.441 and the p-value was .155, indicating that there was no significant difference between the mean scores of the two groups. However, for the post-test of speaking, the t-value was -6.920 and the p-value was .000, indicating that there was a significant difference between the mean scores of the two groups.

Table 4- Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
pre-tests of both	Equal variances assumed	1.021	.316	1.441	61	.155**	.53100	.36853	-.20592	1.26791

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
groups for Sp	Equal variances not assumed			1.438	59.769	.156	.53100	.36919	-.20755	1.26955
post-tests of both groups for Sp	Equal variances assumed	.022	.883	-6.920	61	.000**	-2.45186	.35430	-3.16034	-1.74339
	Equal variances not assumed			-6.928	60.917	.000	-2.45186	.35391	-3.15957	-1.74416

**P<0.05

The table also includes information on Levene's test for equality of variances, the t-test for equality of means, mean difference, standard error difference, and the 95% confidence interval of the difference. The results of Levene's test suggest that the assumption of equal variances was met for the pre-test scores (F = 1.021, p = .316), but not for the post-test scores (F = .022, p = .883). This indicates that the assumption of equal variances was violated for the post-test scores, and thus the t-test results for equal variances not assumed should be interpreted.

The t-test results for the pre-test scores indicate that there was no significant difference in the means between the CG and EG groups (t = 1.441, df = 61, p = .155). This suggests that the two groups had similar speaking abilities at the beginning of the study. The t-test results for the post-test scores indicate that there was a significant difference in the means between the CG and EG groups (t = -6.920, df = 61, p < .001). This suggests that the intervention had a significant positive effect on the speaking skills of the EG group compared to the CG group.

The mean difference for the post-test scores was -2.45186, indicating that the EG group scored on average 2.45 points higher on the post-test than the CG group. The standard error of the difference was .35430, and the 95% confidence interval of the difference ranged from -3.16034 to -1.74339, suggesting that we can be 95% confident that the true population difference lies within this range. The notation "**P<0.05" at the bottom of the table indicates that the level of significance used for the t-test was 0.05, which is a commonly used level in statistical analyses.

Overall, Table 4 provides valuable information about the results of the independent samples t-test for the pre-and post-test scores of speaking skills for the CG and EG groups. The results suggest that the intervention had a significant positive effect on the speaking skills of the EG group compared to the CG group.

Table 5 shows the paired sample statistics for the pre-and post-tests of speaking skills for the control group (CG) and experimental group (EG). The table provides information on the mean scores, sample size, standard deviation, and standard error of the mean for each pair. The table shows that the mean difference between the pre-test and post-test scores of the CG was -.96875, with a standard

deviation of .58458, while the mean difference between the pre-test and post-test scores of the EG was -3.95161, with a standard deviation of .92741. The table compares the performance of each individual in each group and the numeric data shows that there was an improvement in the speaking ability of the experimental group after the intervention.

Table 5- Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre-test of speaking for CG	13.0391	32	1.37973	.24390
	post-test of speaking for CG	14.0078	32	1.45287	.25683
Pair 2	pre-test of speaking for EG	12.5081	31	1.54311	.27715
	post-test of speaking for EG	16.4597	31	1.35569	.24349

Pair 1 shows the statistics for the CG group, with a mean pre-test score of 13.0391 and a mean post-test score of 14.0078. The sample size for this pair was 32, with a standard deviation of 1.37973 for the pre-test scores and 1.45287 for the post-test scores. The standard error of the mean was .24390 for the pre-test scores and .25683 for the post-test scores.

Pair 2 shows the statistics for the EG group, with a mean pre-test score of 12.5081 and a mean post-test score of 16.4597. The sample size for this pair was 31, with a standard deviation of 1.54311 for the pre-test scores and 1.35569 for the post-test scores. The standard error of the mean was .27715 for the pre-test scores and .24349 for the post-test scores.

The paired sample statistics provide valuable information about the changes in speaking skills for each group from pre- to post-test. The mean scores for the post-test were higher than the mean scores for the pre-test for both groups, indicating an improvement in speaking skills after the intervention. The mean difference for the CG group was 0.9687, while for the EG group, it was 3.9516, indicating a larger improvement in the EG group.

The standard deviation and standard error of the means provide information about the variability of the scores within each group. The standard deviation was relatively similar between the two groups for both the pre-and post-tests, with the EG group having slightly higher variability. The standard error of the mean was higher for the EG group for both the pre-and post-tests, indicating a larger sampling error due to the smaller sample size.

Table 6 presents paired samples correlations between the pre-test and post-test scores of speaking for both groups. The

table provides information on the sample size, correlation coefficient, and significance level for each pair. The results in Table 6 show that there is a strong positive correlation between the pre-and post-test scores for both the CG and EG groups. The correlation coefficient for Pair 1 (CG) is .916, indicating a very strong positive correlation between the pre-and post-test scores for the CG group. The correlation coefficient for Pair 2 (EG) is .803, indicating a strong positive correlation between the pre-and

post-test scores for the EG group. These correlations provide information about the relationship between the pre-test and post-test scores and reveal that the intervention had a significant impact on the speaking ability of the students in the EG. The significance level for both pairs is .000, which is less than the commonly used level of .05. This indicates that the correlations are statistically significant and unlikely to have occurred by chance.

Table 6- Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	pre-test of speaking for CG & post-test of speaking for CG	32	.916	.000
Pair 2	pre-test of speaking for EG & post-test of speaking for EG	31	.803	.000

In general, Table 6 provides valuable information about the relationship between the pre-and post-test scores for the CG and EG groups. The strong positive correlations suggest that the scores are related and that the intervention had a positive effect on the speaking skills of both groups. However, it's important to note that correlation does not necessarily imply causation and other factors could have contributed to the changes in speaking skills. Nonetheless, the paired samples correlations provide valuable information on the relationship between the pre-and post-test scores and can help to validate the effectiveness of the intervention especially in the experimental group.

Table 7 indicates the results of the paired samples t-test, which compares the mean differences between the pre-test and post-test

scores of speaking for both groups. The table provides information on the mean differences, standard deviation of the differences, standard error of the mean, and 95% confidence interval of the differences. The table also includes information on the t-value, degrees of freedom, and significance level for each pair. This table provides important information about the effectiveness of the intervention in improving the speaking ability of the students in the experimental group. The table shows that for the CG, the mean difference was -.96875, with a standard error mean of .10334, and the t-value was -9.374 with a p-value of .000, indicating a significant difference between the pre-test and post-test scores of speaking. Similarly, for the EG, the mean difference was -3.95161, with a standard error mean of

.16657, and the t-value was -23.724 with a p-value of .000, indicating a significant

difference between the pre-test and post-test scores of the EG's speaking performance.

Table 7- **Paired Samples Test**

				95% Confidence Interval of the Difference				Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	Lower	Upper	t	df	
	Mean							
Pair 1	pre-test of speaking for CG - post-test of speaking for CG	-.96875	.58458	.10334	-1.17951	-.75799	-9.374	31	.000**
Pair 2	pre-test of speaking for EG - post-test of speaking for EG	-3.95161	.92741	.16657	-4.29179	-3.61144	-23.724	30	.000**

***P<0.05**

The mean difference for Pair 1 (CG) was -.96875, indicating that the post-test scores were higher than the pre-test scores for the CG group. The standard deviation of the differences was .58458, indicating that the scores within the group varied somewhat. The standard error of the mean was .10334, indicating that the sample mean difference was likely to be close to the true population mean difference. The 95% confidence interval of the difference ranged from -1.17951 to -.75799, suggesting that we can be 95% confident that the true population difference lies within this range. The t-value was -9.374, with 31 degrees of freedom, and the significance level was .000, indicating

that the mean difference was statistically significant.

The mean difference for Pair 2 (EG) was -3.95161, indicating that the post-test scores were much higher than the pre-test scores for the EG group. The standard deviation of the differences was .92741, indicating that the scores within the group varied somewhat. The standard error of the mean was .16657, indicating that the sample mean difference was likely to be close to the true population mean difference. The 95% confidence interval of the difference ranged from -4.29179 to -3.61144, suggesting that we can be 95% confident that the true population difference lies within this range. The t-value was -23.724, with 30 degrees of freedom, and

the significance level was .000, indicating that the mean difference was statistically significant but the difference was greater than that of the control group. The notation "**P<0.05" at the bottom of the table indicates that the level of significance used for the t-test was 0.05, which is a commonly used level in statistical analyses.

Overall, Table 7 provides valuable information about the changes in speaking skills for the CG and EG groups from pre- to post-test. The results suggest that the intervention had a positive effect on the speaking skills of both groups. The mean difference for the EG group was larger than that for the CG group, indicating that the intervention had a greater effect on the EG group. The standard deviations of the differences suggest that there was some variability within each group, but the standard error of the mean and the 95% confidence intervals provide strong evidence for the true population differences. Table 7 provides evidence that the use of brainstorming-based collaboration can have a significant positive impact on the speaking ability of Iranian EFL learners. The tables provided support the findings and provide important statistical information that can be used by other researchers and practitioners in the field.

To answer the question "Is there any significant difference between the speaking mean scores of the students receiving traditional methods of teaching and the speaking mean scores of the students receiving brainstorming strategies?", we can especially refer to Table 4, which presents the results of the independent samples t-test. The table shows that for the pre-test of speaking, there was no significant difference between the mean scores of the control group (CG) and the experimental group (EG), with a t-

value of 1.441 and a p-value of .155. This suggests that at the beginning of the study, the speaking ability of the two groups was similar. However, for the post-test of speaking, there was a significant difference between the mean scores of the CG and the EG, with a t-value of -6.920 and a p-value of .000. This indicates that the use of brainstorming strategies had a significant positive impact on the speaking ability of the students in the experimental group, as compared to the traditional methods of teaching used in the control group.

To answer the question "Does the use of brainstorming strategies significantly affect students' speaking proficiency levels?", Table 7 shows the results of the paired samples t-test. The table indicates that there was a significant improvement in the speaking ability of the students in the experimental group after the intervention, with a mean difference of -3.95161 and a t-value of -23.724, with a p-value of .000. This suggests that the use of brainstorming strategies had a significant positive impact on the speaking proficiency levels of Iranian EFL learners. Moreover, Table 6 shows a moderate to strong positive correlation between the pre-test and post-test scores of speaking for the experimental group, suggesting that the intervention was effective in improving their speaking proficiency levels. Overall, all the tables provide strong statistical evidence that the use of brainstorming-based collaboration is an effective teaching strategy in improving the speaking proficiency levels of Iranian EFL learners. And they contribute to answering the research questions in different ways. To put it differently, the tables demonstrate the effectiveness of brainstorming-based collaboration as a teaching strategy in improving the speaking proficiency levels of

Iranian EFL learners, as well as providing important information about the distribution of scores, trends, and patterns in the data.

Qualitative results

In the qualitative part of the study, semi-structured interviews were conducted with 20 EFL teachers to elicit their evaluations of how brainstorming strategies can affect the speaking performance of Iranian EFL learners. The information extracted from the interviews supported the findings gained from the quantitative part of the study. The majority of the teachers believed that brainstorming can help EFL learners prepare for their tasks and think about class topics in useful ways. They also noted that during a brainstorming session, the teacher acts as a facilitator and contributes to group learning. The teachers reported that the learners were enthusiastic about using the brainstorming strategy.

The most frequent opinions of the teachers about the use of brainstorming that we collected through semi-structured interviews are reported as follows:

1. Students can explain more clearly and contribute to discussions through speaking activities.
2. Students have more positive and productive relationships with their teachers and classmates.
3. Students can communicate better in class using brainstorming activities as an idea-generation process.
4. The students are motivated to speak at every session at the very time needed. All members enthusiastically seek moments to verbalize their ideas.
5. Students do not hesitate when speaking in groups; they interact with the teacher and group members without being shy.
6. Students are more confident when speaking in groups.
7. The learners are motivated to use their grammar and vocabulary knowledge to speak.
8. Brainstorming sessions facilitate classroom communication and encourage students to participate in discussions; as a result, the teachers consider themselves successful in teaching speaking.
9. Students have an opportunity to speak more than teachers do in class.
10. Teachers can make use of all the opportunities in teaching time to motivate the students to speak every minute with their teachers and classmates.
11. An authentic context will be provided for the learners to make use of their grammar and vocabulary knowledge when speaking and this authentic context gives them useful hints to improve their speaking skills.
12. It helps them to become autonomous learners as they are exposed to the socio-cultural knowledge of the target language as active speakers.
13. Most of the teachers believed that the students are quite successful in improving their speaking skills because they consider the atmosphere of the classroom something different and funny.
14. Language learners' mistakes are tolerated by their peers.
15. Students with a minimum L2 proficiency level, will not benefit from brainstorming techniques in their language classes.

The attitudes of EFL teachers towards brainstorming as a teaching strategy were evaluated and analyzed qualitatively, and

found to support the quantitative data interpretation. Teachers believed that using brainstorming strategies could engage and enable students in speaking skills, leading to higher levels of cognitive and motivational properties. They also believed that brainstorming strategies could create a dynamic process that develops the quality of students' performance. In classes that use brainstorming, the emphasis is on tasks rather than solely on language, which can lead to

more effective learning. Brainstorming can also enhance communication skills, offer opportunities for realistic interactions, and dissolve psychological obstacles. The majority of teachers concluded that brainstorming is a beneficial strategy for enhancing the spoken abilities of EFL learners.

Discussion and Conclusion

The current research explored how the implementation of brainstorming tactics affect the progress of speaking abilities among two groups of intermediate EFL university students in Rasht, Iran. In this research, the activities through brainstorming techniques and tasks facilitated an atmosphere for the learners to develop their speaking skills because they had the opportunity to share their opinions with their peers. In the created atmosphere the most beneficial situation was the phase in which the students asked questions to each other in exchanging roles of listener and speaker. It is logical to claim that due to the speaking practice throughout the brainstorming sessions, the learners can also develop their vocabulary and grammar. Each phase of the class learning based on brainstorming persuaded the students to use language more authentically to achieve the completion of the task effectively in a stress-free environment. The authenticity and stress-free environment helped the participants feel comfortable and relaxed about their mistakes. The instructor helped the learners positively by giving suggestions as a result, contributed to the improvement of the students' spoken skills in a more meaningful and natural atmosphere.

The results of the study provided strong statistical evidence that the use of brainstorming strategies had a significant positive impact on the speaking ability of the students in the experimental group, as compared to the traditional methods of teaching used in the control group. Moreover, the study found that the use of brainstorming strategies significantly improved the speaking proficiency levels of Iranian EFL learners.

The data indicated that the experimental group exhibited more significant progress compared to the control group, as evidenced by the higher mean score in the posttest of the experimental group in comparison to the control group. The findings of Khodadady et al. (2011) research on whether the utilization of brainstorming strategies improves the speaking and critical thinking abilities of Iranian EFL learners were congruent with the results of the current study. They assessed that brainstorming and speaking skills have a positive correlation. Furthermore, the experimental group exhibited notably superior performance in comparison to the control group. These findings are consistent with previous research that has emphasized the importance of interactive and

collaborative approaches in language learning and teaching. They are consistent with studies discussed in the literature review section; (e.g. Zarif & Mateen 2013; Budiarti 2016; Namaziandost et al. 2019; Octarina et al. 2021; Fitriah et al. 2022) in their studies found that utilizing brainstorming technique enhances the speaking skills of Iranian EFL students.

From the outcomes and theoretical propositions of the related literature, the investigators found that the implementation of the brainstorming strategy in the language learning process fostered a situation for the participants to express themselves freely and to practice the language authentically in the classroom environment which consequently was effective for the enhancement of learners' speaking ability. Brainstorming activities afforded students the chance to refine their speaking abilities while also making the subject matter engaging for the participants. These factors collectively illustrate why utilizing brainstorming-based learning is a useful approach for enhancing the oral proficiencies of students in language learning settings.

In light of the results obtained from the qualitative component of this investigation, brainstorming improved students' speaking skills and developed the attitudes of educators and learners in terms of instructing and acquiring knowledge of the English language. EFL teachers can play an important role in handling the brainstorming-based sessions, then according to the researchers, teacher educators and English supervisors should arrange pre-service and in-service training sessions for teachers who implement brainstorming tactics as part of their teaching routine. Teachers' positive attitudes toward using brainstorming strategies have a key role in encouraging EFL students to take part

in the tasks. Language teachers are then suggested to adopt and apply this strategy and provide EFL learners with instruction on how to allocate sufficient time for brainstorming-based activities in their classes. In conclusion, this study provides evidence that brainstorming-based collaboration is an effective teaching strategy for improving the speaking proficiency levels of Iranian EFL learners.

Conclusion

The activities implemented through brainstorming techniques and tasks created an environment for learners to share their opinions with peers and develop their speaking skills. The most beneficial aspect of this environment was the phase in which students exchanged roles of listener and speaker and asked questions. Speaking practice during the brainstorming sessions also helped learners to improve their vocabulary and grammar. Each phase of the class based on brainstorming encouraged students to use language more authentically to complete tasks effectively in a stress-free environment. The authentic and stress-free environment helped learners feel comfortable and relaxed about their mistakes, and the instructor's positive feedback and suggestions contributed to the improvement of their spoken skills in a more meaningful and natural atmosphere.

Based on the findings of this research and the ideas presented in existing literature, the researchers discovered that incorporating the brainstorming strategy in language learning helped create a supportive environment for participants to freely express themselves and authentically practice the language in the classroom. As a result, this approach proved effective in improving learners' speaking skills. The finding that brainstorming-based

collaboration had a significant impact on the speaking ability of the Iranian EFL learners' is then consistent with the previous research on the benefits of collaborative learning strategies in second language acquisition. This approach is particularly effective in improving speaking abilities because it provides learners with opportunities to practice their oral skills in a supportive and interactive environment.

EFL teachers need to facilitate a situational authenticity wherein the students have the opportunity to involve in an interacting and real-life task. However, such a situation is not usually practical in Iranian classroom settings. As a result, the syllabus designers and EFL teachers are required to foster an interactional authenticity for language learners to ensure that they are practicing and learning in an authentic situation. Based on the results of this research, it is abundantly evident that by involving the EFL learners in an interactive atmosphere through brainstorming-based sessions, as they continue to improve their ability to speak, their related sub-skills will also progress.

Considering both qualitative and quantitative parts of the study, brainstorming tactics in particular, encouraged learners to engage in critical thinking and generate ideas leading to increased participation, feedback, and fluency. This result suggests that the use of brainstorming-based collaboration may be a valuable instructional strategy for EFL teachers to incorporate into their curriculum. Based on the findings from both the quantitative and qualitative aspects of this study, it can be concluded that brainstorming enhances students' speaking abilities and positively influences the mindset of both teachers and learners when it comes to teaching and acquiring knowledge in the

English language. EFL instructors have a significant opportunity to contribute to facilitating brainstorming sessions. As suggested by researchers, it is also beneficial for teacher trainers and supervisors to organize training sessions for both pre-service and in-service teachers who incorporate brainstorming strategies into their teaching practices. The enthusiasm and positive outlook of teachers play a crucial role in motivating EFL students to actively participate in brainstorming activities. It is recommended that language instructors embrace and implement this approach, offering EFL learners' guidance on allocating adequate time for engaging in brainstorming-based tasks during their classes.

In conclusion, the study outcomes demonstrated a strong correlation between applying brainstorming tactics and increasing EFL learners' speaking proficiency. This corresponds with the conclusions of prior investigations. The outcomes further indicated that learners in the experimental group who were instructed to use the brainstorming strategy achieved greater speaking abilities.

When it comes to speaking tasks, instructors should choose or create tasks that allow students to receive and transform knowledge, as the process can improve their speaking abilities and then pave the way for language acquisition. EFL instructors have the best opportunity in contributing to the learners practicing speaking by integrating them in brainstorming-based sessions. Brainstorming strategies can be employed as a method of enhancing oral communication abilities, as it establishes a good basis for successful interactive and communicative exchanges. Language teachers are then suggested to be in constant contact with new techniques in the teaching world.

The findings of this study have important implications for language teachers and learners, as they demonstrate the effectiveness of brainstorming-based collaboration as a teaching strategy for improving speaking proficiency levels. Moreover, the study highlights the importance of incorporating collaborative and interactive teaching strategies in language classrooms. These findings are consistent with previous research that has emphasized the importance of interactive and collaborative approaches in language learning and teaching. Since speaking is considered the most challenging aspect of language learning, the results of this study have practical implications for language educators and material designers seeking to improve the effectiveness of their pedagogical practices. Classroom activities that encourage learners to engage in collaborative brainstorming may be a promising approach to promoting not only language fluency but also critical thinking skills and overall confidence in using the language.

Regarding the validity of the population firstly, the study used a sample of two intact classes that were not randomly selected from a wide range population, indicating that the findings may not be generalizable to the populations of all EFL learners. The generalization of the results to other populations with different English-speaking proficiency levels may be limited. Secondly, the study only focused on the impact of brainstorming-based collaboration on speaking proficiency levels and did not explore its impact on other language skills or aspects of language learning. Thirdly, the participants were only male students failing to account for gender differences. And finally, the individuals in the study possibly reflected a group of people who were motivated learners and held optimistic views toward learning the English language because it was a mandatory requirement to secure a position in the Navy.

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