

## **An Account of Iranian EFL Learners' Speaking Complexity, Accuracy, and Fluency and Foreign Language Speaking Anxiety in a Computer-Assisted Language Learning Environment**

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### **Abstract**

The popularity of integrating language and technology in Computer-Assisted Language Learning (CALL) and its fundamental effect on English language speaking skills have been widely acknowledged. Learners' anxiety is expected to be improved in a web-based computer-assisted language learning environment. This study examined the effects of CALL-based instruction on Iranian EFL learners' speaking complexity, accuracy, and fluency (CAF) and Foreign Language Speaking Anxiety (FLSA). To this end, the Oxford Quick Placement Test (OQPT) was administered and those learners ( $n = 120$ ) whose level of proficiency was intermediate were selected and assigned to an experimental group ( $N = 60$ ) and a control group ( $N = 60$ ). Then, both groups took a speaking pretest, the experimental group received the treatment through CALL-based instruction while the control group was taught based on traditional approaches. Afterward, a speaking posttest and an FLSA questionnaire were administered. The findings of one-way ANCOVA revealed that the experimental group significantly outperformed the control group on the speaking CAF posttest. Moreover, the findings showed that Iranian EFL learners' FLSA lowered significantly after the treatment. The findings of this study can encourage English teachers to use technology in their classes to reach better learning results.

*Keywords:* Computer-assisted language learning, Foreign language speaking anxiety, Complexity, Accuracy, Fluency

### **Introduction**

In developing various fields of study, the vital and prominent role of modern technologies cannot be overlooked. Computers, for example, are increasingly being used in general education, particularly in second language education, giving birth to the phrase "Computer Assisted Language Learning" (CALL) (Chun, 2019; Toraman & Korkmaz, 2022; Vahdat & Eidipour, 2016). CALL is a language learning and teaching approach in which the computers are applied as an instrument for presentation, assisting students,

evaluating materials, and having interactional functions (Akdeniz & Bangir Alpan, 2020; Zaini & Mazdayasna, 2014). According to Levy (1997), CALL can be defined as “the search for and study of applications of the computer in language teaching and learning” (p. 1). Even though revisions for the term have been made regularly in the literature, as Chun (2019) notes, CALL is widely used to refer to the connection between technology and second language (L2) education.

McNeil (2020) stresses that computers and technology can boost English as a foreign language (EFL) classrooms by allowing students to learn in authentic settings. Given the widespread development and use of computers, EFL teachers must take into account how computers can be used in L2 teaching and learning. Moreover, Al-Mubireek (2019) asserts that utilizing computers has significant benefits for EFL teachers since it helps them process and present real-life scenarios with greater flexibility. CALL, according to Lee et al. (2019), is when a computer is utilized as assistance to increase EFL learners’ learning and help them grasp the information more effectively. As a result, computers and Web-based training allow for better educational preparation (Al-Sharah et al., 2021; Butt et al., 2021; Monjezi et al., 2021; Namaziandost et al., 2020). They enable EFL learners to be active in and accountable for their learning, and it may be more suitable than traditional techniques.

More importantly, a shift from a behaviorist model of pedagogy to a constructivist model of education has been observed in the past few decades. According to constructivist theorists, who stress learner-centered instruction, “meaning-making happens in the individual and emerges from his or her experience and social interaction with others” (Luo & Ye, 2021, p. 3). Social constructivists claim that learning, particularly language learning, is a social process that occurs within and outside of an individual. They also argue that learning is not passively determined by external circumstances. Instead, they contend that real learning happens when individuals engage in social activities, i.e., when learners interact with others.

In this regard, researchers hypothesized that current information and communication technology might influence the teachers’ and learners’ lives, particularly in the development of students’ comprehension and capabilities (Ardıç & Çiftçi, 2019; Bárkányi, 2021; Dharma et al., 2017; Hedayati & Marandi, 2014; Namaziandost et al., 2019). This information and communication technology, similar to the philosophy of social constructivism, motivates learners to share their learning experiences and build on their prior knowledge. Thus, it provides an impressive framework for teachers to understand how to drive the effects of internal (intrinsic) or external (extrinsic) factors that give students the power to learn successfully and how students gain more enthusiasm for their learning (Bárkányi, 2021). According to Bashori et al. (2020), the rapid use of CALL in recent years demonstrates that CALL is regarded as an efficient and promising method approach in today’s and tomorrow’s language teaching and learning.

Furthermore, CALL technologies have just strengthened EFL learners’ speaking abilities (Bian, 2021; Pang, 2021; Yang, 2021). Al-Mubireek (2019) states that all skills are vital for effective communication, but speaking skill is the core skill in language learning. Bárkányi (2021) states that “the mastery of the speaking skill in English is a preference for many second and foreign language learners” (p. 10). As a result, EFL students often measure their success in language learning based on how much they have developed their spoken language proficiency. In this regard, Ataiefar and Sadighi (2017) claim that EFL learners’ oral communication abilities can be enhanced by lowering

anxiety levels through technology that promotes the speaking practice. Further, Andujar and Salaberri-Ramiro (2021) revealed that CALL technologies assist learners in improving students speaking abilities. In the form of learning websites, technology also provides several advantages that EFL learners may utilize to develop their English language abilities (Awosusi et al., 2022; Hwang et al., 2016). However, there has been insufficient research in the Iranian context on the merits of CALL-based instruction in strengthening speaking skills and its potential to reduce speaking anxiety.

Another crucial factor in the L2 learning process that further affects EFL learners' learning motivation and learning outcome is FLSA. FLSA is a complicated and multifaceted psychological concept that many EFL encounter when learning a foreign language. This phenomenon has been indicated to affect language learning and be a negative predictor of L2 performance (Elrayah, 2022; Horwitz et al., 1986; Teimouri et al., 2019). High levels of FLSA might make it difficult for EFL learners to speak the target language appropriately and accurately. According to Horwitz et al. (1986), speaking is the most outstanding anxiety-inducing element among other language abilities. Accordingly, Hedayati and Marandi (2014) believe that this anxiety impacts Iranian EFL learners' oral communication and in-class speaking performance. This conclusion is consistent with data indicating that English proficiency in Iran is generally low (Iranmehr & Davari, 2019; Safarieh, 2020). Decreasing FLSA is one method for increasing English proficiency in Iran, but there has not been enough research on dealing with this issue efficiently in the Iranian setting. Considering the importance of speaking skills and FLSA, this study aims to investigate the impact of CALL-based instruction on Iranian EFL learners' speaking CAF and FLSA. This study attempts to respond to the gap in the literature by investigating the effects of CALL-based instructions on improving Iranian EFL learners' speaking skills and lowering their FLSA.

## **Review of the Literature**

### **Computer-Assisted Language Learning**

Today, computers play an important role in any education system. Abe (2021) asserts that nowadays, the world without computers, digital media, or the Internet is not meant for everyone, including EFL learners. CALL can promote EFL learners' motivation by personalizing information, using animate objects on the screen, and providing practice activities that incorporate challenges and curiosity within a specific situation (Jiang & Chun, 2021). In addition, CALL is the student-oriented nature of the learning process- it is the EFL students who control the pace of learning and select what should be learnt and practiced and how they should learn it (Sauro, 2017). This, in turn, makes them feel more proficient in their learning (Ozguzel, 2020; Vahdat & Eidipour, 2016; Sifatu et al., 2020).

Developers of CALL argue that it provides interactive learning. Some computer software, in particular, includes the following comprehension tools, which enable EFL learners to ask for modifications of the input they hear/read to enhance comprehension (Al-Mansour & Al-Shorma, 2012; Reynolds & Kao, 2021). First, when confronted with a piece of text, including some unknown lexical words, computers can provide clarifications, rephrasing, glossaries, dictionaries, and translation to help EFL understand

the meaning of the text (i.e., making input comprehensible) (Kumar et al., 2019; Soyoof et al., 2021). Second, when a computer is combined with a CD-ROM or videodisk, computers can give extra-linguistic aids such as accurate and precise sounds, photos, real-life videos, animations, and the like. These extra-linguistic assistances help EFL learners understand more effectively and make the input comprehensible (Dwijendra et al., 2021; Soyoof, 2022).

With the advent of computers and using them in the classrooms, educational studies were conducted to determine their effects on students' learning (products). These conventional studies utilized a media comparison method in which an experimental group received a certain "treatment" (e.g., CALL reading lessons), whereas the control group did not (Al Ayub Ahmed et al., 2021; Chun, 2019; Yogantari & Dwijendra, 2020). After the treatment, the researchers checked the participants' performance to see whether the specific target skill (e.g., reading comprehension) was better enhanced in the experimental than in the control group. Different researches have produced contradictory results. In 2014, Zaini and Mazdayasna found that CALL lessons, as employed in the experimental group, had no higher effect on EFL learners' writing development than traditional teaching approaches.

Moreover, Abu Naba'h et al. (2011) concluded that reading comprehension improvement did not differ substantially between the control and CALL groups. However, Saracho (1982) probed the influence of a CALL program on basic skills development and discovered that students in the Spanish-speaking CALL program outperformed those in the traditional classroom program. Furthermore, Dalton and Hannafin (1987), in a study evaluating the influence of word processing on composition, found that word processing was better than traditional education for low achievers. In addition, Abu Naba'h et al. (2011) evaluated CALL for English grammar review and concluded that the grammar test score for the CAL part was considerably higher than the non-CAL part. More recently, Abdulmalik Ali (2018) revealed that students who utilized a text analysis program enhanced their writing and editing abilities compared to students who did not utilize this program.

Educators and researchers have always mentioned the merits of CALL; however, CALL instruction has its drawbacks. First, computers cannot accurately analyze EFL learners' verbal interactions with others, and what the machine pronounces differs entirely from what people produce (McNeil, 2020; Ravali, 2020). Second, CALL software stability and quality are controversial. Commercial sources, which some instructors rely on, may not produce the desired educational outcomes (Lee, 2021). Third, some EFL teachers and learners lack adequate computer literacy, which might impede the learning process (McNeil, 2020; Samadi & Samadi, 2020). Consequently, CALL has advantages and disadvantages, but its advantages are more. It can be concluded that CALL can facilitate L2 teaching and learning, and the use of the computer can have a beneficial effect on enhancing students' achievement (Ozerol, 2009).

### **Online Learning Platforms**

There are numerous platforms, such as Zoom, which are used for online instruction. Zoom is a web-based video conferencing platform that includes a desktop client and a mobile application that lets people meet online, with or without video. Zoom users can record sessions, work together on projects, and share or comment on one

another's screens, all from a single, simple platform. The founder of the Zoom Meeting application is Eric Yuan. This platform was inaugurated in 2011, and its head office is in San Jose, California. This platform is not only used for learning but can be used for office and other matters. We can communicate directly with anyone via video on the Zoom Meeting platform. Zoom enables two-way interaction between remote students and teachers with features that help support remote or distance learning (Rahayu, 2020). Up to 200 participants can actively participate in live sessions, while an extra 3000 learners can watch the session passively (Alosaimi, 2021; Dharma et al., 2017).

Within the Zoom environment, students can take part in a number of instructional activities. Communication-related activities include welcoming others, classroom presentations, question and answer sessions, and group debates in breakout rooms (Rahayu, 2020). Individual meetings between learners and lecturers can also be held to discuss the student's work, and these meetings can be videotaped for later review (Lee et al., 2021; Martín-Monje & Borthwick, 2021; Melhe et al., 2021). The use of Zoom to teach in an online context has multiple benefits. According to Rahayu (2020), more than 60% of university students were able to communicate through writing or speaking by utilizing this program. Furthermore, learners could answer questions on the shared whiteboard, comprehend lessons, and work successfully with other classmates (Ruhuya, 2020; Luo & Ye, 2021). Likewise, as with other forms of synchronous online interaction, Zoom can help students feel less socially isolated and build a sense of community (Lowenthal et al., 2020; Borup et al., 2020).

### **Speaking Skill and Speaking Complexity, Accuracy, and Fluency**

Individuals use speaking skills to communicate in a social context. Also, speaking is the process of building and sharing meaning through verbal and non-verbal symbols (Namaziandost & Nasri, 2019). According to Ellis (2008), L2 performance could be explained by three dimensions of CAF. This CAF triad has been applied in examining EFL learners' oral and written performance. As for the origin of the three components, in the 1980s, a distinction was made between the fluency and the accuracy of language use (Dalton & Hannafin, 1987; Rouhollahi et al., 2020). Michel (2017) notes complexity as the third component of the triad. Complexity refers to how EFL learners' output is elaborate and varied. They tend to risk using their inter-language structures that are "cutting edge, elaborate and structured" (Ellis, 2008, p. 113). Michel (2017) defines complexity as the size, elaborateness, richness, and diversity of EFL learners' performance. According to Michel (2017), complexity is related to the stage of elaboration of the underpinning inter-language system. Likewise, Ellis (2008) considers complexity as the ability to apply more advanced L2 elements. Ellis believes that complexity is determined by EFL learners' motivation to try out new linguistic information in oral performance. On the other hand, accuracy is defined as the degree to which EFL learners' production is based on the rule system of the target language (Ellis, 2008). According to Michel (2017), accuracy is a metric for target-like and error-free language usage. It refers to the ability of L2 learners to control their inter-language complexity to stop committing inaccurate constructions (Ahmadian & Tavakoli, 2011). Finally, fluency is characterized as L2 learners' ability to produce the target language at a natural speed the same as native speakers without redundant pauses. It occurs when L2 learners give primacy to meaning over form (Yousefi, 2016). In other words, fluency

refers to the smoothness, ease, and eloquence of speech production with a few pauses, hesitations, or reformulations (Michel, 2017; Namaziandost et al., 2019).

Taken together, speaking is one of the leading media of communication among nations. In EFL contexts, it requires great attention and special instruction. Like other non-native speakers, Iranian English learners might face certain problems and challenges while trying to develop their speaking skills, which can hinder them from communicating orally when required to do so.

### **Foreign Language Speaking Anxiety**

According to Horwitz et al. (1986), anxiety is a psychological condition caused by an activation of the autonomic nervous system. This state is undoubtedly shown by nervousness, tension, concern, and/or dread of doing specific tasks (Horwitz et al., 1986). They verified the existence of particular anxiety known as Foreign Language Anxiety (FLA) or Foreign Language Classroom Anxiety existed (FLCA). The findings of the research reveal that this specific anxiety hinders EFL learners' learning progress (Bárkányi, 2021; Bashori et al., 2020; Teimouri et al., 2019). FLCA is often measured using the FLACA Scale (FLCAS), a questionnaire designed by Horwitz et al. (1986) and extensively implemented by numerous researchers. This type of anxiety is common in L2 learning, especially in speaking. Speaking anxiety among EFL learners is evident when they are requested to do tasks in front of the class or during on-the-spot or improvised performances (Bashir et al., 2020; Bahmani Choubbasti et al., 2019). Likewise, Bashir et al. (2020) stress that two of the most important causes of why EFL learners experience speaking anxiety are their fear of making mistakes in their pronunciation and their dread of being humiliated by their classmates due to such mistakes. Some researchers in Iran have examined EFL learners' anxiety in English Foreign Language classrooms. Ataiefar and Sadighi (2017) reported that many EFL learners felt nervous during learning activities, which is induced by task pressure and requires them to speak individually and spontaneously within an allotted time. In addition, Hedayati and Marandi (2014) believe that some EFL learners are likely to remain quiet because of a lack of confidence, a lack of understanding of the subjects given, and a lack of teacher-student interaction. Since EFL students today are extremely familiar with technology and the Internet, Hedayati, and Marandi (2014) advocated for the use of media and/or technology to assist Iranian EFL learners' learning.

Although in the literature, a range of studies have explored the effects of CALL-based instruction on improving L2 learning (Abdulmalik, 2018; Abdallah Abu Naba'h et al., 2021; Al-Mansour & Al-Shorma, 2012; Al-Mubireek, 2019; Ataiefar & Sadighi, 2017; Bárkányi, 2021; Martín-Monje & Borthwick, 2021; McNeil, 2020), it is needed to study this topic more, particularly in the Iranian context, on speaking CAF and speaking anxiety. Thus, this study bridged these gaps and endeavored to check the impact of CALL on speaking CAF. It also investigated whether Iranian intermediated EFL learners' FLSA diminishes in a CALL-based language learning environment. To fulfill these objectives, the following research questions were put forward:

RQ1. Does CALL-based instruction have any significant effects on Iranian EFL learners' speaking CAF?

RQ2. Does CALL-based instruction have any significant effects on Iranian EFL learners' FLSA?

## Methodology

### Design of the Study

This study used a quasi-experimental design. As Riazi (2016) notes, researchers can use a quasi-experimental to create a cause-and-effect relationship between variables where there is no random assignment. Therefore, in this study, two intact classes were selected and went through a pre-test, intervention, and post-test. Using a quasi-experimental design, the present study explored the effects of CALL-based instruction on Iranian EFL learners' speaking complexity, accuracy, and fluency (CAF) and Foreign Language Speaking Anxiety (FLSA).

### Participants

To ensure that the participants were homogeneous regarding their English language proficiency and were all at the intermediate level, an OQPT test with 120 items was administered. The OQPT is a flexible English language proficiency test developed and validated by Oxford University (2005). It is used worldwide to give a time-saving and reliable report of students' level of English language proficiencies. A total of 120 intermediate EFL learners were selected. Indeed, non-random convenience sampling was employed to select the participants. As Riazi (2016) notes, in the non-random sampling, the sample participants are selected based on criteria other than just random chance. The underlying reason for this was their easy availability to the researchers. The participants were then randomly divided into two equal groups; one control group (CG;  $N = 60$ ) and one experimental group (EG;  $N = 60$ ). The students of Pooyesh Language School were regarded as the experimental group and Sadr Institute of Higher Education students as the control group. The participants were both female and male, and their ages ranged from 19 and 22 years. The participants' native language was Persian. We also had permission to conduct this research from their management.

### Instruments

The researchers used some instruments to collect the required data. The first instrument included OQPT administered to make the participants homogenized. Based on the results, the participants whose scores fell between 30 and 47 (out of 60) were selected and randomly assigned to an experimental group and a control group. This test consists of 60 recognition items. Of particular note is that although OQPT has been validated by over 6,000 students in 20 countries, and its reliability has been reported at 0.90, the researchers measured its reliability through a pilot test. For this purpose, the test was administered to 20 students, similar to the main study participants. The results of Cronbach alpha yielded 0.86, which were found acceptable for this study. Regarding its validity, it was given to two well-experienced English instructors, and they confirmed that there were no problems with it in terms of face and content validities.

The second instrument was a researcher-made speaking pre-test. Several questions concerning the topics of the learners' textbook (i.e., *American Headway 3*) were included in the pre-test. The participants were asked to talk about each topic for 5 minutes, and their speech was recorded for analysis by two raters (the first and second researchers of the current study). To assure the validity of the pre-test (which was held in the form of an interview), first, the topics were chosen from the topics covered in the participants' coursebook. Second, the topics/questions were given to a group of English experts to examine their suitability for use with the target participants. They confirmed that the selected topics enjoyed a high level of face and content validities and can be used for the present study. In addition, to measure the reliability of the pre-test, it was given to two raters and the results of the inter-rater reliability using Pearson correlation analysis yielded  $r = 0.94$ . Of particular note is that the raters were well-experienced and had a good command of statistical analysis in assessment.

The third instrument was the CAF speaking post-test whose topics were chosen from the textbook above. It measured the participants' speaking performance in terms of complexity, fluency, and accuracy. The complexity included syntactic complexity (i.e., the ratio of clauses to AS units in the participants' production.) and syntactic variety (i.e., the total number of different grammatical verb forms used in the participants' performance). The fluency entailed rate A (i.e., the number of syllables produced per minute of speech) and rate B (i.e., the number of meaningful syllables per minute of speech). The accuracy comprised error-free clauses (i.e., the percentage of the clauses that were not erroneous.) and correct verb forms (i.e., the percentage of all verbs that were used correctly in terms of tense, aspect, modality, and subject-verb agreement.). The reliability of the post-test was calculated through inter-rater reliability utilizing Pearson correlation analysis ( $r = 0.89$ ), and a group of English instructors confirmed its validity. It is worth noting that the CAF test has been previously used by other researchers (e.g., Ahmadian & Tavakoli, 2011; Yousefi, 2016).

The fourth instrument was the FLSA, originally developed by Horwitz et al. (1986) and later modified by Öztürk and Gürbüz (2014). There were 33 items on Foreign Language Classroom Anxiety (FLCA) on a five-point scale (from *strongly agree* to *strongly disagree*); 18 of these items, based on Öztürk and Gürbüz (2014), concentrated on FLSA. These items were highly reliable (Cronbach's Alpha = 0.879). Since the questionnaire is a 5-graded Likert scale, the total score ranged from 18 to 90. A total score of more than 72 indicated a high level of speaking anxiety; a total score of 54 to 72 showed a moderate level of speaking anxiety; a total score of less than 54 denoted a low level of FLSA. It is worth pointing out that the FLSA questionnaire was given to the groups twice, once before the treatment and once after the treatment. It should be noted that the researchers assessed the reliability and validity of the FLSA questionnaire before running the main study. To this end, they asked 30 EFL learners who were similar to the participants of the main study to complete it. The results of the Cronbach alpha reported 0.92, which was appropriate for this study. Additionally, they invited two university professors in Applied Linguistics at Isfahan University to examine its validity. They offered some minor comments regarding language and content, and the researchers made the according to modifications. In the end, the researchers recruited two experts in translation to translate the items of the FLSA into Persian. This was necessary to increase the credibility of the students' responses.

Of particular note is that the researchers used confirmatory factor analysis to measure the construct validity of the instruments above. In doing so, they considered two criteria, including the eigenvalue of each factor and the loading of each item of the factors. The results demonstrated that the eigenvalue of all factors was equal to or greater than 1.0. and the loading of all items of the factors was greater than or equal to 0.3. Thus, the researchers concluded that the instruments enjoyed the required construct validity.

### **Data Collection Procedure**

The researchers took some steps to run the present study. First, they administered the OQPT to make the participants homogenized. The participants ( $n = 120$ ) whose scores fell around the mean were selected and assigned randomly into an experimental group ( $n = 60$ ) and a control group ( $n = 60$ ). Second, the researchers measured the participants' speaking performance and level of anxiety prior to the treatments. Third, the researchers asked participants to install Zoom applications on their smartphones, PCs, and laptops. They assured that the participants know how to use the application and provided them with detailed explanations of its features and options. The Zoom application enjoys some outstanding features. For example, it allows collaboration with a large number of individuals, including annotation, chat, breakout room, and whiteboarding, it allows presenters to share their applications or whole desktop, it allows dynamic voice detection, it allows scheduling, recording, and it provides large room and webinar, and it offers mobile devices (Rahayu, 2020). Third, the instructor followed the seven-step procedure to run the treatment. In the first step, he drew the participants' attention to speaking. He got the students to think about the speaking topic, what is included and what they could anticipate. He presents the topic to the class and encouraged the student to focus on it. In the second step, he provided the required input. It involved teaching the words, expressions, chunks, and discourse features that were needed to do the target speaking task. In the third step, the speaking task was conducted. He had the participants conduct a communicative speaking task with a focus on fluency, accuracy, and complexity. In doing so, they were involved in presenting their opinions and views on the topic in a friendly climate. The instructor managed the classroom such that all the participants had opportunities to express their opinions. In the fourth step, the instructor drew the participants' attention to the strategies that could foster their speaking performance in terms of fluency, accuracy, and complexity. In the fifth step, the speaking task was repeated. In the fifth step, the instructor directed the participants' reflection on learning. He encouraged the participants to reflect on what they have learned and the difficulties they faced during the previous step. In the seventh step, the instructor provided feedback on the participants' performance and got them to give feedback on their peers' performance. It should be stressed that the session was recorded and the participants could refer back to it when it was necessary. Concerning the control group, the classes were run in a conventional way where the participants did not have access to technological devices, such as computers, smartphones, and laptops. In each session, the instructors introduced a topic and wrote it down on the whiteboard. Afterward, he asked the participants to present their opinions toward it one-by-one. The treatments were offered in 19 one-hour sessions. Fourth, the researchers administer the speaking test and the anxiety questionnaire to measure the participants' speaking ability and level of anxiety at the end of the instruction.

## Results

First of all, after assuring the normality distribution through the Kolmogorov Smirnov test ( $p > 0.05$ ), it was necessary to check if there was any difference between both groups' pretest of speaking CAF and FLSA pretest. Therefore, an independent samples t-test was run:

Table 1  
*Results of Descriptive Statistics (Speaking CAF Pretest and FLSA Questionnaire Pretest)*

	Groups	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error Mean</i>
SF Pre	EG	60	12.80	.76	.09
	CG	60	12.84	.79	.10
SA Pre	EG	60	12.18	.99	.12
	CG	60	11.90	1.11	.14
SC Pre	EG	60	12.77	.83	.10
	CG	60	12.66	.81	.10
FLSA Pre	EG	60	72.86	92.34	11.92
	CG	60	66.05	12.84	1.65

**Note.** SF: Speaking Fluency; SA: Speaking Accuracy; SC: Speaking Complexity; Pre: Pretest

Table 1 shows the EG and CG learners' mean scores on the speaking CAF pretest and FLSA pretest. The mean scores almost show that there is no difference between the EG and CG learners on the speaking CAF pretest. Moreover, no difference was found between both groups on the FLSA pretest, and both groups had a high level of speaking anxiety. However, a t-test was run to see if the difference between these mean scores and the two groups on the speaking CAF pretest and FLSA pretest were statistically significant.

Table 2  
*Results of the Independent-Samples T-Test (Speaking CAF Pretest and FLSA Pretest Scores of EG and CG)*

		Levene's Test for Equality of Variance		t-test for Equality of Means				
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)	Mean Difference	Std. Error Difference
SF Pre	Equal variance	.25	.61	-.29	118	.77	-.04	.14

	s assumed Equal variances not assumed							
				-.29	117.77	.77	-.04	.14
SA Pre	s assumed Equal variances not assumed	1.48	.22	3.02	118	.39	.28	.19
	s assumed Equal variances not assumed			3.02	116.39	.39	.28	.19
SC Pre	s assumed Equal variances not assumed	.42	.51	.72	118	.47	.10	.14
	s assumed Equal variances not assumed			.72	117.93	.47	.10	.14
FLS A Pre	s assumed Equal variances not assumed	1.22	.27	.56	118	.57	6.81	12.03
	s assumed Equal variances not assumed			.56	61.28	.57	6.81	12.03

Based on the information presented in Table 2, as the  $p$  values were larger than 0.05 ( $p > .05$ ), it is concluded that there was not a statistically significant difference in the speaking CAF pretest and FLSA pretest scores for EG and CG. Hence, it could be inferred that the learners in the two groups were at the same level of speaking CAF and FLSA. Since the FLSA mean score of both groups was higher than 72, it reveals that both groups were at a higher level of speaking anxiety before the treatment (Öztürk & Gürbüz, 2014).

To find a logical answer to the first research question of the study, the speaking CAF posttest scores of the EG and CG learners had to be compared. The researcher could

have used an independent-samples t-test to achieve this goal, but to control for any potential pre-existing differences between these two groups and compare their post-test results, one-way ANCOVA was used:

Table 3

*Results of Descriptive Statistics (Speaking Fluency Post-test Scores of the EG and CG)*

Groups	Mean	Std. Deviation	N
EG	16.03	.91	60
CG	12.97	.83	60
Total	14.50	1.76	120

In Table 3, it could be found that the speaking fluency post-test means score of the EG learners was larger than that of the CG learners. To determine whether or not this difference was statistically significant, a one-way ANCOVA was needed to be run:

Table 4

*Results of the One-Way ANCOVA (Speaking Fluency Posttest Scores of the EG and CG)*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	289.83	2	144.91	208.25	.00	.78
Intercept	42.32	1	42.32	60.82	.00	.34
SF Pretest	9.23	1	9.23	13.26	.00	.10
Groups	283.15	1	283.15	406.91	.00	.77
Error	81.41	117	.69			
Total	25615.75	120				
Corrected Total	371.24	119				

In Table 4, if you find the row labeled Groups in the leftmost column and read across this row, under the *Sig.* column, you can find the *p*-value, which should be compared with the alpha level of significance (i.e., .05). The *p*-value here was lower than the alpha level of significance ( $.00 < .05$ ), which indicates that the difference between the two groups of EG and CG on the speaking fluency posttest was statistically significant. This means that using the treatment (i.e., *CALL-based instruction*) could significantly improve the speaking fluency of the EG learners.

Table 4 also includes the effect size value, given under the Partial Eta Squared column in front of Groups. This value was .77, indicating that the treatment accounted for 77% of the difference between the EG and CG learners.

Table 5

*Results of Descriptive Statistics (Speaking Accuracy Post-test Scores of the EG and CG)*

Groups	Mean	Std. Deviation	N
EG	16.27	.97	60
CG	12.30	1.30	60
Total	14.28	2.30	120

Table 5 displays the descriptive statistics of both groups on the speaking accuracy post-tests. Seemingly, the experimental group outperformed the control group on the accuracy post-test. This claim can be accepted or rejected by running a one-way ANCOVA test in the following table:

Table 6  
*Results of the One-Way ANCOVA (Speaking Accuracy Post-test Scores of the EG and CG)*

Source	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>Sig.</i>	Partial Eta Squared
Corrected Model	492.35	2	246.17	208.74	.00	.781
Intercept	83.13	1	83.13	70.49	.00	.37
SA Pretest	18.33	1	18.33	15.54	.00	.11
Groups	392.94	1	392.94	333.19	.00	.74
Error	137.98	117	1.17			
Total	25126.25	120				
Corrected Total	630.33	119				

Table 6 shows that there was a statistically significant difference in the speaking accuracy posttest scores of the EG and CG learners since the *p*-value under the *Sig.* column in front of Groups was less than the significance level (i.e.,  $.00 < .05$ ). Accordingly, using *CALL-based instruction* could significantly improve the speaking accuracy of the FEG learners. It is also worth noting that the effect size value, shown under the Partial Eta Squared column in front of Groups, equaled .74, which means that the treatment accounted for 62% of the difference between the speaking accuracy post-test scores of the EG and CG learners.

Table 7  
*Results of Descriptive Statistics (Speaking Complexity Posttest Scores of the EG and CG)*

Groups	<i>Mean</i>	<i>Std. Deviation</i>	<i>N</i>
EG	16.33	.95	60
CG	12.86	.91	60
Total	14.60	1.97	120

Regarding the groups' mean scores, as indicated in Table 7, it seems that the experimental group outflanked the control group on the speaking complexity post-test. A one-way ANCOVA test was run to see if the difference between the speaking complexity posttests of both groups was significant.

Table 8  
*Results of the One-Way ANCOVA (Speaking Complexity Post-test Scores of the EG and CG)*

Source	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>Sig.</i>	Partial Eta Squared
Corrected Model	368.13	2	184.06	227.48	.00	.79
Intercept	55.72	1	55.72	68.86	.00	.37
SC Pretest Groups	7.59	1	7.59	9.38	.03	.07
Error	352.04	1	352.04	435.08	.00	.78
Total	94.66	117	.80			
Corrected Total	26042.00	120				
	462.80	119				

As Table 8 demonstrates, there was a statistically significant difference in the speaking complexity posttest scores of the learners in the EG and CG since the *p*-value under the *Sig.* column in front of Groups was smaller than 0.05 (i.e.,  $.00 < .05$ ). As shown under the Partial Eta Squared column ( $=.78$ ), the magnitude of this difference was very large. This means that using *CALL-based instruction* significantly affected EFL learners' speaking complexity in the EG.

The second research question of the study was essentially similar to the first one, except that it was about the FLSA of the EFL learners. That is, it intended to find out whether using *CALL-based instruction* could significantly affect the FLSA of Iranian intermediate EFL learners. Thus, the FLSA posttest scores of the EG and CG learners were compared through a one-way ANCOVA:

Table 9  
*Results of Descriptive Statistics (FLSA Post-test Scores of the EG and CG)*

Groups	<i>Mean</i>	<i>Std. Deviation</i>	<i>N</i>
EG	41.86	4.83	60
CG	64.95	13.08	60
Total	53.40	15.19	120

In Table 9, it could be found that the FLSA of the EG lowered significantly after the treatment. However, to find out whether this difference was a statistically significant one or not, a one-way ANCOVA was conducted:

Table 10  
*Results of the One-Way ANCOVA (FLSA Post-test Scores of the EG and CG)*

Source	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>Sig.</i>	Partial Eta Squared
Corrected Model	16033.33	2	8016.66	81.99	.00	.58
Intercept	156761.04	1	156761.04	1603.28	.00	.93

Anxiety Pre	48.12	1	48.12	.49	.48	.00
Groups	16033.21	1	16033.21	163.98	.00	.58
Error	11439.65	117	97.77			
Total	369767.00	120				
Corrected	27472.99	119				
Total						

In Table 10, the *Sig.* value was lower than the alpha level of significance ( $.00 > .05$ ), which indicates that the difference between the two groups of EG and CG on the FLSA posttest was statistically significant. This means that using the *CALL-based instruction* had significantly affected the FLSA of the experimental group. According to Öztürk and Gürbüz (2014), participants with a total score of less than 54 demonstrated a low degree of FLSA; it can, thus, be concluded that the FLSA of the EG learners diminished thanks to CALL-based instruction.

## Discussion

Regarding the first research question of this study, the results showed that the experimental group who had received CALL-based instruction outflanked the control group who had been deprived of CALL-based instruction. The findings may be attributed to the features and merits of using CALL in teaching. Additionally, the results disclosed that the CALL-based instruction fostered the speaking CAF of the participants. The results may be ascribed to this view that the CALL-based instruction might have been enjoyable and easy, and it had many benefits, such as saving participants' time and effort. The results also indicated that CALL-based instruction could change the process of English learning and teaching in a better way. The CALL-based instruction could encourage cooperative learning among the participants since it was designed in a way that it could foster cooperation among the participants. Accordingly, the participants might have had better opportunities to work with each other to learn the target materials substantially (Rassaei, 2021; Soyooof et al., 2021). Furthermore, it may be argued that the CALL-based environment might have engaged the participants in interactive activities that might have led to improving the participants' critical thinking skills and involved them in social interactions (Ebadi & Ebadijalal, 2020; Hedayati & Marandi, 2014).

Another line of discussion for the findings of the study may be linked to the outstanding advantages of CALL-based instruction. For example, aligned with Ebadi et al. (2021), it may be argued that the CALL-based instruction might have created a lasting effect on the participants' visuals, making it more straightforward for them to grasp the content of an educational video. In a sense, it may be argued that it was also simpler for the participants to repeat the content if they did not comprehend it yet; additionally, they could repeat those difficult parts. Undoubtedly, this might have reduced the time of learning compared to traditional instruction. Besides, along with Abdulmalik Ali (2018), it is argued that while the computers couldn't engage the participants in authentic two-way communication, the CALL-based instruction might have provided rich input in the form of integrated multimedia programs that could be viewed and reviewed at the participants' own pace. This argumentation receives support from Hwang et al. (2016), who found that multimedia training generally saved the learning time by 30% compared

to traditional education. Likewise, aligned with Levy (1997), it may be argued that the multimedia training characteristics such as learner involvement and learner control over programs resulted in better achievement outcomes for the participants.

To discuss the findings of the study more deeply, it may be argued that CALL-based instruction could offer more repetition opportunities. Through the repetition, prior acquired and internalized L2 knowledge might have become more automatic and, therefore, might have improved the participants' fluency (Michel, 2017). Additionally, the computers could also be used to complete the conversations, potentially enhancing fluency since the "automaticity of spoken language [will improve] through spoken practice" (Andujar & Salaberri-Ramiro, 2021, p. 9). In the same vein, as Abe (2021) notes, the CALL-based instruction could also help the learners strengthen their speaking abilities by practicing them appropriately. The findings are in line with those of Martn-Monje and Borthwick (2021), reporting that their students' pronunciation abilities enhanced significantly after attending the CALL program.

Furthermore, another justification for the findings is that with its fascinating design materials, the CALL-based instruction might have motivated the participants during the teaching-learning processes. That is, the online resources were intriguing; the learners could search for their video in some assignments, and it could provide a perfect demonstration of English language usage (spoken by a native). The CALL-based instruction could create incredible chances for boosting second language learning, such as increasing students' enthusiasm or expanding learners' different linguistic capabilities (Monjezi et al., 2021). This, in turn, might have boosted the participants' learning.

The final line of discussion for the findings may be that the CALL-based instruction could facilitate the exchange of ideas and information while also helping develop lifelong learning skills through a simple access to a wide range of global resources (Abdulmalik Ali, 2018). In other words, it could be argued that this virtual environment might have strengthened the cross-cultural connections, resulting in successful cooperation between the instructors and the student at various institutions both locally and internationally. In other words, it may be argued that CALL-based instruction could provide a comfortable setting for the learners to interact and communicate with their peers and the teacher. Moreover, along with the findings, it may be argued that in the CALL-based instruction environment, the participants could have access to the materials and feedback even long after the course (Al-Mansour and Al-Shorma, 2012; Luo & Ye, 2021; McNeil, 2020).

Regarding the second research question of this study, the results demonstrated that CALL-based instruction had a positive influence on Iranian EDL learners' FLSA. It means that the experimental group's anxiety lowered significantly after receiving CALL-based instruction. The CALL-based instruction could help the instructor design less stressful activities which actualize a non-threatening, positive and relaxed learning atmosphere. Accordingly, this might have reduced the participants' anxiety and successively increased their motivation to foster their learning. Along with Jeon (2021), it can be argued that the CALL-based instruction could provide appropriate teaching aids which might have been suitable for the learners to surpass the effects of FLSA.

Additionally, the findings may be explained from this view that CALL-based instruction could help foster the learner-teacher rapport and broaden the language learning experience beyond the confines of the classroom (Azizi, 2022). Further, to justify the findings of the study, it may be argued that the combination of text, sound effects, and

images could increase the diversity of teaching and the learners' motivation by meeting their varying needs through multimodal practice. That is, the exciting graphics, music, and animation could make the learning environment more enjoyable and fun. When the computers were used as a platform where the communication between the teachers and learners occurred, the dread of being judged negatively was reduced to the maximum (Soyoof, 2022).

Another line of discussion for the results of the study may be ascribed to this view that as FLSA stems from the fear of making mistakes and the constant fear of negative evaluation, the use of computers might have made the learners feel free to speak without feeling embarrassed by creating an uncommon social and communicative arena in which they feel less constrained (Lee, 2021). In other words, it may be argued that the computer-mediated communication could render an anonymous environment due to the reduction/elimination of paralinguistic (e.g., frowning, raised eyebrows) and social clues (e.g., age, gender); thus, it might have made available maximum opportunities for oral practice for the learners to become more comfortable in conversing in English (Reynolds & Kao, 2021). Thus, by improving the learners' communication skills, the CALL-based instruction could reduce their foreign language anxiety, especially their communication apprehension (Lee et al., 2019).

Finally, in line with the results of this research, it may be argued that the virtual environment could decrease the learners' anxiety and increase their perceived competence as it might have reduced the affective filter and encouraged role-playing, as there was less apprehension and embarrassment (Bárkányi, 2021; Kohar, (2022). The findings are following those of Al-Mubireek (2019), revealing the low level of deterrence and social anxiety created in a virtual environment. In general, the findings of the study are in line with those of the previous studies (Al-Mansour & Al-Shorma, 2012; Ataiefar & Sadighi, 2017; Bárkányi; 2021; Ozerol, 2009), reporting that the CALL-based instructions had positive effects on lowering English learners' FLSA.

## **Conclusion**

Based on the findings of the study, it can be concluded that CALL is a compelling alternative platform that can create a positive impact on EFL learners' speaking CAF and FLSA. It can provide EFL learners with a learning terrain that is learner-centered, supportive, and motivating with clear task orientation. This, in turn, can enhance their foreign language outcomes by reducing their foreign language learning anxiety. Additionally, in light of the results of the study, it can be concluded that computers can be used as a tool and medium to help EFL learners overcome the handicap of affective filter and increase their English language proficiency. In a sense, the utilization of CALL strategies can minimize the cognitive interferences caused by FLA and foster EFL learners' language proficiencies. With sound pedagogical underpinnings, the insights derived from the findings of this study can be beneficial in making well-informed curricular decisions in increasing the effectiveness of foreign language teaching and learning.

The results of this research may be beneficial for EFL teachers, materials developers, and EFL learners to consider CALL-based instruction and other technological devices productive to foster learning processes. The findings of the study may persuade

EFL teachers to accommodate technological tools, such as mobiles, tablets, the Internet, and the like, in their classes to make way for language learning (Jafari et al., 2021; Rasti-Behbahani & Shahbazi, 2020). In addition, the results of this study may help EFL teachers consider the use of technology as an integral part of second language education. Materials developers can be the other beneficiary of the findings of this study. They can be encouraged to give more attention to the design and development of online instructional materials. Also, the results of this research can help EFL learners improve their self-studies out of the classroom by using online instructions. They need to be in touch with technological devices and use them for cultivating their English learning (Soyooft et al., 2022).

Like any other study, this study suffered from some limitations that may open new avenues for more studies. Firstly, the small number of participants could be considered a hindrance to the generalizability of the results. Therefore, future studies can include larger samples to increase the generalizability of the results. Thirdly, the limited period of treatment is another constraint that should be stressed. Thus, more studies with a larger period are needed to increase the credibility of the findings of the study. Thirdly, probable unobserved associations between participants might have triggered a shift in their speaking CAF during the learning phase. Hence, future studies should consider this vital point in their design and implementation. Fourthly, this study only addressed speaking skills. Thus, future studies can tackle other language skills, such as speaking, listening, and writing. Fifthly, this study was carried out on Iranian intermediate EFL learners; so that interested researchers can include EFL learners with other different language proficiencies. Finally, future research is offered to consider other variables such as autonomy and self-regulation in the CALL-based environment.

## References

- Abdulmalik Ali, M. (2018). Computer-based instruction: how a web-based course facilitates English grammar instruction. *CALL-EJ*, 19(1), 43-59. <http://callej.org/journal/19-1/Ali2018.pdf>
- Abe, M. (2021). L2 interactional competence in asynchronous multiparty text-based communication: study of online collaborative writing. *Computer Assisted Language Learning*, 34(4), 409-433. <https://doi.org/10.1080/09588221.2019.1614070>.
- Abu Naba'h, A., Hussain, J., Al-Omari, A. A., & Shdeifat, S. (2011). The effect of computer assisted language learning in teaching English grammar on the achievement of secondary students in Jordan. *International Arab Journal of Information Technology* 6(4), 431-439. <https://eis.hu.edu.jo/deanshipfiles/pub100526558.pdf>
- Ahmadian, M. J., & Tavakoli, M. (2011). The effects of simultaneous use of careful online planning and task repetition on accuracy, fluency, and complexity of EFL learners' oral production. *Language Teaching Research*, 15(1), 35-59. <https://doi.org/10.1177%2F1362168810383329>.
- Akdeniz, H., & Bangir Alpan, G. (2020). Analysis of gifted and talented students' creative problem solving styles. *Talent*, 10(1), 79-94. DOI: <https://doi.org/10.46893/talent.758416>.

- Al Ayub Ahmed, A., Acwin Dwijendra, N. K., Babu Bynagari, N., Modenov, A. K., Kavitha, M., & Dudukalov, E. (2021). Multi project scheduling and material planning using lagrangian relaxation algorithm. *Industrial Engineering & Management Systems*, 20(4), 580-587. <https://doi.org/10.7232/iems.2021.20.4.580>
- Al-Mansour, N. S., & Al-Shorma, R. A. (2012). The effect of computer assisted-instruction on Saudi university student's learning of English. *Journal of King Saud University–Languages and Translation*, 24, 51-56. <https://doi.org/10.1016/j.jksult.2009.10.001>.
- Al-Mubireek, S. (2019). E-Learning in the English classroom: Comparing two E-Learning platforms impacting preparatory year students' language learning, *CALL-EJ*, 20(2), 19-37. <http://callej.org/journal/20-2/Al-Mubireek2019.pdf>
- Alosaimi, D. (2021). Learning self-efficacy as predictor of nursing students' performance of clinical skills. *Educational Sciences: Theory and Practice*, 21(3), 120-131. <http://dx.doi.org/10.12738/jestp.2021.3.009>.
- Al-Sharah, N., Dudeen, H., Yajid, M. S. A., Khatibi, A., & Ariffin, I. A. (2021). The learning of vocabulary and the usage of portmanteaus by Jordanian EFL students. *Eurasian Journal of Applied Linguistics*, 7(2), 147-161. Doi: <http://dx.doi.org/10.32601/ejal.911512>.
- Andujar, A., & Salaberri-Ramiro. M. S. (2021). Exploring chat-based communication in the EFL class: computer and mobile environments. *Computer Assisted Language Learning*, 34(4) 434-461. <https://doi.org/10.1080/09588221.2019.1614632>.
- Ardıç, Ö., & Çiftçi, H. (2019). ICT competence and needs of Turkish EFL instructors: The role of gender, institution and experience. *Eurasian Journal of Applied Linguistics*, 5(1), 153-173. Doi: 10.32601/ejal.543791.
- Ataiefar, F., & Sadighi, F. (2017). Lowering foreign language anxiety through technology: A case of Iranian EFL sophomore students. *English Literature and Language Review*, 3(4), 23-34. [https://www.arpgweb.com/pdf-files/ellr3\(4\)23-34.pdf](https://www.arpgweb.com/pdf-files/ellr3(4)23-34.pdf)
- Awosusi, A.A., Xulu, N.G., Ahmadi, M., Rjoub, H., Altuntaş, M., Uhunamure, S.E., Akadiri, S.S., and Kirikkaleli, D. (2022). The sustainable environment in Uruguay: the roles of financial development, natural resources, and trade globalization. *Front. Environ. Sci.* 10:875577. doi: 10.3389/fenvs.2022.875577
- Azizi, Z. (2022). A phenomenographic study on university English teachers' perceptions of online classes during the COVID-19 pandemic: A focus on Iran. *Education Research International*, 23, 1-25. <https://doi.org/10.1155/2022/1368883>.
- Bárkányi, Z. (2021). Motivation, self-efficacy beliefs, and speaking anxiety in language MOOCs. *ReCALL*, 33(2), 143-160. <https://doi.org/10.1017/S0958344021000033>
- Bashori, M., van Hout, R., Strik, H., & Cucchiarini, C. (2020). Web-based language learning and speaking anxiety. *Computer Assisted Language Learning*, 1-31. DOI: 10.1080/09588221.2020.1770293.
- Bian, Z. (2021). Evaluation of sports ads value based on consumer psychology. *Revista De Psicología Del Deporte (Journal of Sport Psychology)*, 30(3), 25-36. <https://www.rpd-online.com/index.php/rpd/article/view/469>.
- Butt, B., Khan, M. A., Mahmood, S., Hamid, A., Hussain, A. (2021). Serial verb construction vs Complex Predicates in Punjabi: An integrated analysis of event

- structure. *Eurasian Journal of Applied Linguistics*, 7(2), 1-21. Doi: <http://dx.doi.org/10.32601/ejal.911501>.
- Dalton, D. W. & Hannafin, M. J. (1987). The effects of word processing on written composition. *The Journal of Educational Research*, 80(6), 338-342. <https://doi.org/10.1080/00220671.1987.10885779>.
- Dharma, H. R. C., Asmarani, D., & Dewi, U. P. (2017). Basic Japanese grammar and conversation e-learning through Skype and Zoom online application. *Procedia Computer Science*, 116, 267-273. <https://doi.org/10.1016/j.procs.2017.10.055>.
- Dwijendra, N.K.A., Akhmadeev, R., Tumanov, D., Kosov, M., Shoar, S., Banaitis, A. (2021). Modeling Social impacts of high-rise residential buildings during the post-occupancy phase using DEMATEL Method: A Case Study. *Buildings*, 11(11):504. <https://doi.org/10.3390/buildings11110504>.
- Ebadi, S., & Ebadijalal, M. (2020). The effect of Google Expeditions virtual reality on EFL learners' willingness to communicate and oral proficiency. *Computer Assisted Language Learning*, 1-25. <https://doi.org/10.1080/09588221.2020.1854311>.
- Ellis, R. (2008). *The study of second language acquisition (2nd edition)*. Oxford University Press.
- Elrayah, M. (2022). Improving teaching professionals' satisfaction through the development of self-efficacy, engagement, and stress control: a cross-sectional study. *Educational Sciences: Theory and Practice*, 22(1), 1-12. <http://dx.doi.org/10.12738/jestp.2022.1.0001>
- Hedayati, H., & Marandi, S. (2014). Iranian EFL teachers' perceptions of the difficulties of implementing CALL. *ReCALL*, 26(3), 298-314. <https://doi.org/10.1017/S0958344014000172>.
- Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *Modern Language Journal*, 70(2), 125-132. <https://doi.org/10.2307/327317>.
- Hwang, W., Shadiev, R., Hsu, J., Huang, Y., Hsu, G., & Lin, Y. (2016). Effects of storytelling to facilitate EFL speaking using Web-based multimedia system. *Computer Assisted Language Learning*, 29(2), 215-241. <https://doi.org/10.1080/09588221.2014.927367>.
- Iranmehr, A., & Davari, H. (2019). English language education in Iran: A site of struggle between globalized and localized versions of English. *Iranian Journal of Comparative Education* 1(2), 70-84. DOI: <https://dx.doi.org/10.22034/ijce.2018.87725>.
- Jafari, S., Talebinejad, M., & Ketabi, S. (2021). Comparative effects of technology-, motivational-, and metacognitive-based scaffolding on male and female Iranian adult advanced EFL learners' speaking. *Research in English Language Pedagogy*, 9(2), 259-282. doi: 10.30486/relp.2021.1912273.1229.
- Jeon, J. (2021). Chatbot-assisted dynamic assessment (CA-DA) for L2 vocabulary learning and diagnosis. *Computer Assisted Language Learning*, 1-27. <https://doi.org/10.1080/09588221.2021.1987272>.
- Jiang, Y., & Chun, D. (2021). Web-based intonation training helps improve ESL and EFL Chinese students' oral speech. *Computer Assisted Language Learning*, 1-29. <https://doi.org/10.1080/09588221.2021.1931342>.
- Kohar, D. (2022). measuring the effectiveness of the brain-based learning model on the level of reading comprehension based on exposition reading structures in junior

- high school. *Educational Sciences: Theory and Practice*, 22(1), 78-89. <http://dx.doi.org/10.12738/jestp.2022.1.0007>
- Kumar, K., Singh, K. V., & Prakash, A. (2019). Empirical assessment of sustainable banking issues in the Indian banking sector. *Journal Of Asia Entrepreneurship And Sustainability*, 15(3). <http://www.asiaentrepreneurshipjournal.com/JAESVolXVDec2019.pdf>.
- Lee, H., Lee, S., Ko, J., & Bang, H., (2021). Investigating the effects of course satisfaction and career decision-making efficacy on intrinsic motivation of undergraduates in beauty health major. *Educational Sciences: Theory and Practice*, 21(3), 147-157. <http://dx.doi.org/10.12738/jestp.2021.3.011>.
- Lee, H., Warschauer, M., & Lee, J. (2019). Advancing CALL research via data-mining techniques: Unearthing hidden groups of learners in a corpus-based L2 vocabulary learning experiment. *ReCALL*, 31(2), 135-149. <https://doi.org/10.1017/S0958344018000162>.
- Lee, J. S. (2021). *Informal digital learning of English: Research to practice*. Routledge.
- Levy, M. (1997). *CALL: Context and conceptualization*. Oxford University Press.
- Lowenthal, P., Borup, J., West, R., & Archambault, L. (2020). Thinking beyond Zoom: Using asynchronous video to maintain connection and engagement during the COVID-19 pandemic. *Journal of Technology and Teacher Education*, 28(2), 383-391. <https://www.learntechlib.org/primary/p/216192/>.
- Luo, R., & Ye, Z. (2021). What makes a good-quality language MOOC? An empirical study of criteria to evaluate the quality of online language courses from learners' perspectives. *ReCALL*, 33(2), 177-192. <https://doi.org/10.1017/S0958344021000082>.
- Martín-Monje, E., & Borthwick, K. (2021). Researching massive open online courses for language teaching and learning. *ReCALL*, 33(2), 107-110. <https://doi.org/10.1017/S0958344021000094>.
- McNeil, L. (2020). Implementing digital game-enhanced pedagogy: Supportive and impeding language awareness and discourse participation phenomena. *ReCALL*, 32(1), 106-124. <https://doi.org/10.1017/S095834401900017X>.
- Melhe, M. A., Salah, B. M., & Hayajneh, W. S. (2021). Impact of training on positive thinking for improving psychological hardiness and reducing academic stresses among academically-late students. *Educational Sciences: Theory and Practice*, 21(1), 132-146. <http://dx.doi.org/10.12738/jestp.2021.3.010>.
- Michel, M. (2017). Complexity, accuracy and fluency (CAF). In Shawn Loewen & Masatoshi Sato, *The Routledge Handbook of Instructed Second Language Acquisition*. Routledge.
- Monjezi, M., Mashhadi, A., & Maniati, M. (2021). COVID-19: Is it time you made the CALL? *Computer Assisted Language Learning Electronic Journal*, 22(2), 56-72. <http://callej.org/journal/22-2/Monjezi-Mashhadi-Maniati2021.pdf>.
- Namaziandost, E., & Nasri, M. (2019). The impact of social media on EFL learners' speaking skill: A survey study involving EFL teachers and students. *Journal of Applied Linguistics and Language Research*, 6(3), 199-215. <http://www.jallr.com/index.php/JALLR/article/download/1031/pdf1031>
- Namaziandost, E., Homayouni, M., & Rahmani, P. (2020). The impact of cooperative learning approach on the development of EFL learners' speaking fluency. *Cogent Arts & Humanities*, 7(1), 1-15. DOI: 10.1080/23311983.2020.1780811.

- Namaziandost, E., Shatalebi, V., & Nasri, M. (2019). The impact of cooperative learning on developing speaking ability and motivation toward learning English. *Journal of Language and Education*, 5(3), 83-101. <https://doi.org/10.17323/jle.2019.9809>.
- Ozerol, G. (2009). *Perceptions of EFL primary school teachers towards CALL*. Unpublished MA Thesis, Turkey: Cukurova University.
- Ozguzel, S. (2020). Evaluation and identification of barriers to tourism in Islamic countries. *Journal of Social science and Humanities Research*, 8(3), 61-68. <https://doi.org/10.24200/jsshr.vol8iss3pp61-68>.
- Öztürk, G. & Gürbüz, N. (2014). Speaking anxiety among Turkish EFL learners: The case at a state university. *Journal of Language and Linguistic Studies*, 10(1), 1-17. <https://dergipark.org.tr/en/pub/jlls/issue/9938/122913>.
- Pang, Y. (2021). Psychological crisis intervention of college sports majors based on big data analysis. *Revista De Psicología Del Deporte (Journal of Sport Psychology)*, 30(3), 124-132. <https://www.rpd-online.com/index.php/rpd/article/view/479>.
- Rahayu, D. (2020). Students' E-Learning Experience through a Synchronous Zoom Web Conference System. *Journal of ELT Research: The Academic Journal of Studies in English Language Teaching and Learning*, 5(1), 68-79. <https://journal.uhamka.ac.id/index.php/jer/article/view/4115>
- Rassaei, E. (2021). Implementing mobile-mediated dynamic assessment for teaching request forms to EFL learners. *Computer Assisted Language Learning*, 1-31. <https://doi.org/10.1080/09588221.2021.1912105>.
- Rasti-Behbahani, A., & Shahbazi, M. (2020). Investigating the effectiveness of a digital game-based task on the acquisition of word knowledge. *Computer Assisted Language Learning*, 1-25. <https://doi.org/10.1080/09588221.2020.1846567>.
- Ravali, S. (2020). Evaluation and analysis of ethical issues in the field of medicine. *Journal of Social science and Humanities Research*, 8(3), 55-60. <https://doi.org/10.24200/jsshr.vol8iss3pp55-60>.
- Reynolds, B. L., & Kao, C-K. (2021). The effects of digital game-based instruction, teacher instruction, and direct focused written corrective feedback on the grammatical accuracy of English articles. *Computer Assisted Language Learning*, 34(4), 462-482. <https://doi.org/10.1080/09588221.2019.1617747>.
- Riazi, A. M. (2016). *The Routledge encyclopedia of research methods in applied linguistics*. Routledge.
- Safarieh, M. (2020). Evaluation of relationship creativity with academic achievement in qualitative-descriptive evaluation. *Journal of Social science and Humanities Research*, 8(3), pp.43-49. <https://doi.org/10.24200/jsshr.vol8iss3pp43-49>.
- Samadi, H. & Samadi, N. (2020). Study of life skills based on the verses of the textbook of Holy Quran. *Journal of Social science and Humanities Research*, 8(3), 37-42. <https://doi.org/10.24200/jsshr.vol8iss3pp37-42>.
- Saracho, O. (1982). The effects of a computer-assisted instruction program on basic skill achievement and attitudes toward instruction of Spanish-speaking migrant children. *American Education Research Journal*, 12, 201-219. <https://doi.org/10.3102%2F00028312019002201>.
- Sauro, S. (2017). Online fan practices and CALL. *Calico Journal*, 34(2), 131-146. <https://www.jstor.org/stable/90014685>.

- Sifatu, W. O., Sjahruddin, H., Fajriah, Y., Acwin Dwijendra, N. K., & Santoso, A. (2020). Innovative work behaviors in pharmacies of indonesia: role of employee voice, generational diversity management and employee engagement. *SRP*, *11*(2): 725-734. [10.31838/srp.2020.2.105](https://doi.org/10.31838/srp.2020.2.105).
- Soyoofo, A. (2022). Iranian EFL students' perception of willingness to communicate in an extramural digital context. *Interactive Learning Environments*, *13*(3), 1-18. doi: [10.1080/10494820.2021.2024579](https://doi.org/10.1080/10494820.2021.2024579).
- Soyoofo, A., Reynolds, B. L., Shadiey, R., & Vazquez-Calvo, B. (2022). A mixed-methods study of the incidental acquisition of foreign language vocabulary and healthcare knowledge through serious gameplay. *Computer Assisted Language Learning*, 1-34. <https://doi.org/10.1080/09588221.2021.2021242>.
- Soyoofo, A., Reynolds, B. L., Vazquez-Calvo, B., & McLay, K. (2021). Informal digital learning of English (IDLE): a scoping review of what has been done and a look towards what is to come. *Computer Assisted Language Learning*, *22*(1), 1-27. <https://doi.org/10.1080/09588221.2021.1936562>.
- Teimouri, Y., Goetze, J., & Plonsky, L. (2019). Second language anxiety and achievement: A meta-analysis. *Studies in Second Language Acquisition*, *41*(2), 363-387. <https://doi.org/10.1017/S0272263118000311>.
- Toraman, Ç., & Korkmaz, G. (2022). The great barrier to teaching profession: Technicism, rethinking the meaning of professionalism through teachers' experience. *International Online Journal of Education and Teaching (IOJET)*, *9*(1), 486-505. <https://www.iojet.org/index.php/IOJET/article/view/1582>
- Vahdat, S., & Eidipour, M. (2016). Adopting CALL to improve listening comprehension of Iranian junior high school students. *Theory and Practice in Language Studies*, *6*(8), 1609-1617. <http://dx.doi.org/10.17507/tpls.0608.13>
- Yang, C. (2021). Correlation analysis on social psychological adjustment, sports cultural products consumption, and sports cultural industry development. *Revista De Psicología Del Deporte (Journal of Sport Psychology)*, *30*(3), 86-96. <https://www.rpd-online.com/index.php/rpd/article/view/476>.
- Yogantari, M. V., & Dwijendra, N. K. A. (2020). Visual Exploration using acrylic paint on used fashion items for sustainable use. *International Journal of Psychosocial Rehabilitation*, *24*(3). <https://www.psychosocial.com/article/PR201902/17516>.
- Yousefi, M. A. (2016). The influence of affective variables on the complexity, accuracy, and fluency in L2 oral production: the contribution of task repetition. *Journal of English Language Teaching and Learning*, *17*(3), 25-48. [https://elt.tabrizu.ac.ir/article\\_4959\\_1f1e153ea1490e86e5815e8714ee17f5.pdf](https://elt.tabrizu.ac.ir/article_4959_1f1e153ea1490e86e5815e8714ee17f5.pdf)
- Zaini, A. & Mazdayasna, G. (2014). The effect of computer assisted language learning on the development of EFL learners' writing skills. *Procedia-Social and Behavioral Sciences*, *98*(2), 1975-198. <https://doi.org/10.1016/j.sbspro.2014.03.631>.