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CALL and MALL-Mediated Shadowing: The Effects on Impulsive vs. Reflective EFL Learners' Speaking Abilities

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The present study investigated the effect of computer- and mobile-mediated shadowing on Iranian impulsive and reflective English as a Foreign Language (EFL) learners' speaking ability. To collect the data, 100 intermediate participants, whose proficiency level was measured by administering Oxford Quick Placement Test (OQPT), took the pretest of speaking. A personality type questionnaire was also used to detect the learners' impulsivity or reflectivity. There were four experimental groups including 1) computer (Prezi) + shadowing + impulsive learners; 2) computer (Prezi) + shadowing + reflective learners; 3) mobile (WhatsApp) + shadowing + impulsive learners; and 4) mobile (WhatsApp) + shadowing + reflective learners. Then, the posttest was administered. After the descriptive and inferential analyses of the pre- and post-tests, significant improvement was observed among the four experimental groups' speaking ability. However, reflective learners were shown to outperform the impulsive learners in both computer and mobile-mediated shadowing groups. The results can be beneficial to English language learners, teachers, teacher trainers, as well as material developers.

Keywords: CALL, impulsivity, MALL, reflectivity, speaking

INTRODUCTION

Concerning the significance of teaching speaking, Krashen (1985) states "speaking is the result of acquisition and not its cause" (p. 2). The significance of the learners' speaking ability can be traced back to the late 1970s when Hatch (1978) proposed that, "language learning evolves out of learning how to carry on conversations, out of learning how to communicate" (p. 63). In this regard, research studies have been emerged to provide empirical evidence regarding the importance of teaching speaking in the area of L2 or foreign language learning. Thus, a variety of methodologies has been emerged in order to develop the learners' speaking ability one of which has been shadowing.

Shadowing occurs as a result of listening to a task in which the heard speech is tracked by learners and they repeat it as exactly as possible (Mochizuki, 2006). In fact, shadowing is an online procedure where students must vocalize the speech as soon as they hear it, unlike superficially similar activities like repetition, which is offline and gives students, time to think about and replicate what they have heard. The subtle difference is that: in shadowing learners focus exclusively on incoming sounds and improving their speech perception of the target language (Kadota, 2007)

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Hamada (2012) states that shadowing was initially employed as an instructional tool for interpreters. In the majority of cases (Mochizuki, 2006; Onaha, 2004; Suzuki, 2007) shadowing was shown to have a great effect on listening skill. It is also worth mentioning that shadowing was found to be effective on the learners' speaking ability (Yavari & Shafiee, 2019; Zakeri, 2014). However, in today's world of technology-mediated instruction, shadowing, as an effective technique to foster learners' communication, can be integrated with technological devices; as suggested by Foote and McDonough (2017), to produce more promising contributions regarding the learners' development of speaking.

When it comes to bridging the gap between language teaching and technology, researchers have provided sufficient evidence regarding the impressive benefits technology could bring about in the learning environment (Alzoebi, et al., 2023; Chau, 2021; Kulusaklı, 2022; Nutta, 2013; Razaghi, et al., 2022; Torabi, 2020). Although there might be challenges among language scholars to adopt the most effective and applicable technological devices in the language classroom, there has been a large-extent consensus that both teachers and learners can benefit from the variety of learning tasks to help learners engage in a cooperative environment equipped with technology-mediated language learning (Mulyadi et al., 2021; Tran, 2021; Wang, 2016). Computer and mobile technologies have boosted the architecture of technology-enhanced language learning, which call for inspiration from computer- and mobile-assisted language learning (CALL and MALL). Teachers, and to some extent learners, have been the supporters of CALL (Fathi & Ebadi, 2020; Mittal, 2015) and MALL (Pasarıbu & Wulandarı, 2021; Taj et al., 2017) in paving the way for partiicpants to experienced self-regulated learning.

The role of individual differences in learning style; specially impulsivity versus reflectivity is also another concern of this study. In fact, the researchers aim to investigate the mediating role of this variable with regard to the impact of shadowing mediated through CALL versus MALL on speaking ability. Impulsivity refers to the extent to which learners make quick decisions and guess the answer to questions without correctly reflecting on the issus and their comprehension; while reflectivity is about those capabilities of language learners to reflect on questions and think about them prior to responding to them (Folse, 2008)

METHOD

To provide the rationale for the present study, four main gaps deserve attention. First, research on shadowing has been found to be effective more on the learners' listening comprehension ability (Mochizuki, 2006; Onaha, 2004; Suzuki, 2007), and less on speaking (Yavari & Shafiee, 2019; Zakeri, 2014). Second, reserch studies have separetly investigated the potential effects of technology-mediated instruction throuh CALL and MALL on learners' speaking (Chau, 2021; Mulyadi et al., 2021; Saed et al., 2021; Tran, 2021). Third, the interaction of impulsivity and reflectivity with many language learning variables has been recognized in the foreign language learning contexts (Motallbezadeh & Samadi 2017). But, the learners' impulsivity and reflectivity regarding technology-mediated shadowing appears not to have been taken into account up to the present. Last but not least, technology-mediated shadowing and its impact on learners' speaking has rarely been surveyed (Foote & McDonough, 2017), thus; bridging the gaps in previous researches, this study aimed to investigate the effects of CALL versus MALL-mediated shadowing on the improvement of Iranian intermediate impulsive and reflective EFL learners' speaking ability by addressing the following research hypotheses:

H01. Attending speaking skill lessons through computer-mediated shadowing has no significant impact on Iranian impulsive EFL learners' speaking ability.

H02. Attending speaking skill lessons through computer-mediated shadowing has no significant impact on Iranian reflective EFL learners' speaking ability.

H03. There is not any statistically significant difference between the impacts of attending speaking skill lessons through computer-mediated shadowing on Iranian impulsive and reflective learners' speaking ability.

H04. Attending speaking skill lessons through mobile-mediated shadowing has no significant impact on Iranian impulsive EFL learners' speaking ability.

H05. Attending speaking skill lessons through mobile-mediated shadowing has no significant impact on Iranian reflective EFL learners' speaking ability.

H06. There is not any statistically significant difference between the impacts of attending speaking skill lessons through mobile-mediated shadowing on Iranian impulsive and reflective learners' speaking ability.

Regarding the philosophical foundation, Sociocultural theory is the main theoretical framework in this study. The fundamental concept of sociocultural theory is that the human mind is mediated in society and the learning environment, and how humans build a relationship between themselves and the world (society) is constructed through cultural artifacts which is created by human culture in that society (Vygotsky, 1978; Lantolf, 2000). Socio-cultural theory is concerned with some terms, including mediation, tool, scaffolding, and regulation. Mediation is the central concept of socio-cultural theory. Vygotsky (1978) claims that culturally constructed auxiliary means are used to mediate higher forms of human mental activity (Lantolf & Throne, 2006). Accordingly, Alanen (2006) maneuvers on the role of mediation by highlighting the context of interaction, which is of importance within the socio-cultural theory. Similar to mediation within Vygotskian perspective is the term 'tool'. Vygotsky aimed to draw an analogy between the role of technical and mechanical tools and what he called "psychological tools" (Vygotsky, 1981, p. 136, cited in Lantolf & Appel, 1994). The notion of regulation is also well elaborated by Vygotsky (1981) in that he recognized the role of other-regulator when the learners needs special attention or support by a knowledgeable peer and gradually moves to self-regulation through which the learners attempts to rely on his/her capabilities to solve the problem he/she encounters. Furthermore, scaffolding is made when the teacher provides necessary support to help learners own the learning environment and feel more confident in the learning environment (Lantolf, 2000). Hence, Socio-cultural theory which is originated from the works of Vygotsky justifies the using of CALL and MALL as technological instruments through which shadowing was done to examine its effects on Iranian EFL learners' speaking ability.

Participants

Using purposeful convenience sampling, the participants included 100 intermediate language learners, studying in Tarjoman and Simin Language Institutes in Karaj, Iran, who were the candidates to investigate the effect of technology-mediated shadowing through CALL and MALL on their speaking ability. The homogeneity of the participants was ensured by administering OQPT in the sense that they were in the same level of proficiency to meet the research objectives. It is worth mentioning that the whole population of the study was 150 learners, while after OQPT administration, 100 intermediate learners were selected and the remaining 50 learners were considered as outliers. The participants' age range was between 19 and 22 years old. They were also 63 female and 37 male learners. The questionnaire was used to determine the learning style of the participants in terms of impulsivity/reflectivity. They were randomly divided into four experimental groups: 1) CALL + shadowing + impulsive learners; 2) CALL + shadowing + reflective learners; 3) MALL+ shadowing + impulsive learners; and 4) MALL + shadowing + reflective learners. There were 52 impulsive (experimental group 1 = 26; experimental group 3 = 26) and 48 reflective (experimental group 2 = 24; experimental group 4 = 24) learners (based on their responses to the personality type questionnaire which was used to determine the learning style of the participants in terms of impulsivity/reflectivity.)

Instruments

The instruments below were used in the current study:

Oxford Quick Placement Test (OQPT)

OQPT was utilized to ensure participants' homogeneity to select intermediate language learners. In other words, the participants' proficiency level was checked by the administration of OQPT prior to the initiation of the treatment sessions. The reliability of OQPT was calculated as .90 by Geranpayeh (2003).

Speaking Pre- and Psot-Tests

To test the learners' initial speaking ability, they took the pre-test. It is based on the Cambridge Preliminary English Test (PET). The PET speaking test has four parts and each learner works with another candidate to complete the required speaking tasks. Two raters who were experts in the field of TEFL and had at least ten years of teaching experience assessed the learners' speaking ability. They used the PET band score as the criteria for speaking assessment. The inter-rater reliability was calculated to be 0.84. Design interviewing with participants was the first part of PET in which the researcher asked some general questions and learners were requested to provide factual or personal information. As to the second part of the test, there were two pictures related to "language learning" and "at a party", requiring learners to have extended turn-takings by focusing on the target pictures. The third and fourth sections constituted some pictures about "work and relaxation", asking learners to have discussion on the pictures and to provide suggestions, make more alternatives and negotiate agreement. Finally, learners were asked to answer to some general questions regarding their interests, likes, and dislikes, encouraging them to share their viewpoints together.

The speaking post-test was used in order to examine the effect of CALL and MALL-mediated shadowing on the impulsive and reflective learners' speaking ability. Conducting the post-test underwent a similar procedure as the pre-test, while some minor changes took place in the selection of pictures.

Personality Type Questionnaire

A Persian personality type questionnaire was administered to identify the learners' personality type concerning their impulsivity or reflectivity styles (Bazargani & Larsari, 2013). The questionnaire was the Persian translation of Eysenck's Personality Questionnaire (1975, as cited in Bazargani & Larsari, 2013). It includes 30 items and there are three answers in front of each item including 'Yes', 'No', and '?. The participants were provided with sufficient information how to answer each item by putting a circle around the 'Yes' or the 'No'. If their answer was neither of them, they were asked to choose the '?' sign.

Reliability of the Pre- and Post-Tests

The pre-and post-tests' reliability was checked through Kuder-Richardson formula (KR-21) to be .83 and .85 for the pre- and post-tests, respectively. Two raters, who were M.A. graduates of TEFL; with at least ten years of experience and considered as experts in the field, scored the learners' speaking ability in pre and posttests. The inter-rater reliability was calculated to be 0.84.

Design

The present study was conducted through a quasi- experimental, pre-test-post-test design to examine the effects of computer- and mobile-mediated shadowing on the Iranian intermediate impulsive and reflective EFL learners' speaking ability. The learners were assigned to four experimental groups, including 1) CALL + shadowing + impulsive learners; 2) CALL + shadowing + reflective learners; 3) MALL+ shadowing + impulsive learners; and 4) MALL + shadowing + reflective learners. Participants were assessed on their speaking through a pre-treatment test and then a post-treatment test. The difference between the pre-tests and the post-tests was calculated. Due to some limitations in

getting the permission from the management office, this study did not have any control group. However, the inclusion of a control group is proposed as a suggestion for further researches under the conclusion part of the study.

The present study benefited from quantitative research method to provide a broader understanding of the effect of computer- and mobile-mediated shadowing on the learners' speaking ability concerning their impulsivity and reflectivity. The learners' speaking scores of the pre- and post-tests were examined by two experts in the field; having at least ten years of EFL teaching experience, in order to have a thorough comparison of the experimental groups.

Data Collection Procedure

Initially, the researcher conducted necessary coordination with the heads of Tarjoman and Simin Language Institutes for legal permissions of data collection procedures. After that, OQPT was administered among the whole population of the study (n = 150) to ensure participants' homogeneity and select intermediate language learners. Then, the selected participants of the study were thoroughly informed regarding the objectives of the study. In the next phase, the participant took personality questionnaire to determine their impulsivity and reflectivity. Then, the pre-test was given to examine their initial performance in speaking. The selected participants were divided into four experimental groups. They underwent ten 2-hour treatment sessions of technology-mediated shadowing through CALL (Prezi) and MALL, working on the selected tasks of listening comprehension. In other words, all the materials covered in the learners' textbooks (Top Notch series, third edition, intermediate level) along with supplementary materials (including pictures, audio, and video files) were utilized by the teacher in order to enhance their listening opportunities. Concerning the features of the above-mentioned activities, three forms of shadowing were applied, including complete, selective, and interactive (Murphey, 2001).

In the complete type, learners were requested to repeat all the teacher's statemenst. In selective shadowing, the parts that contain the most important messagees were repeated. And, lastly relating to the interactive type, comments were provided by the learners although some parts of the teacher's autterances were repeated. It is worth mentioning that the teacher initially modeled the above-mentioned types of shadowing in order to familiarize the learners how to conduct shadowing as appropriately as possible. The learners were also requested to stay online at the exact time of each session, and the teacher held the online sessions in CALL and MALL groups.

The learners in the CALL group were initially informed regarding the basic guidelines of the Prezi Presentation Software and how they were to carry out shadowing techniques in the so-called learning environment. All the learners installed Prezi on their desktop computers in order to be able to do the required speaking tasks. In other words, all listening materials were covered by Prezi, and learners were required to consciously apply it in performing shadowing techniques. In order to facilitate the instruction in the CALL group, Skype platform was used in order to help the teacher and learners to use Prezi as effectively as possible. Pictures, audio, and video files were used as supplementary materials to help learners be more engaged in the classroom activities and take an active role in doing interactive shadowing to improve their listening potential.

As to the MALL group, MALL was used as a medium of listening activities. All the above-mentioned listening activities were uploaded in the WhatsApp group created by the teacher. The learners were requested to conduct shadowing techniques through MALL. In addition, the teacher tried to give sufficient feedback through MALL in order to encourage all learners' participation in the classroom, particularly more reticent ones.

After the treatment sessions, the learners were given the post-test to measure their achievement scores in terms of the impact of CALL versus MALL-mediated shadowing on their speaking ability.

Data Analysis Procedure

The present study used quantitative data analysis method to answer the research questions by conducting descriptive and inferential statistics. Descriptive measures were related to the possible development of a learner's mean score from the pre-test to the post-test. However, inferential statistics imply the possibility of a significant difference in the speaking ability of experimental groups affected by technology-mediated shadowing through CALL and MALL.

The first, second, fourth, and fifth research questions of the study were analyzed by running paired samples t-test to compare the experimental groups' performances in the CALL and MALL groups and according to their impulsivity and reflectivity, separately. However, independent samples t-test was run to investigate differences between impulsive and reflective learners' speaking ability affected by computer- and mobile-mediated shadowing.

FINDINGS

As to the objectives of the study, the following null hypotheses were tested in the sections below:

$H_0$1. Attending speaking skill lessons through computer-mediated shadowing has no significant impact on Iranian impulsive EFL learners' speaking ability.

$H_0$2. Attending speaking skill lessons through computer-mediated shadowing has no significant impact on Iranian reflective EFL learners' speaking ability.

$H_0$3. There is not any statistically significant difference between the impact of attending speaking skill lessons through computer-mediated shadowing on Iranian impulsive and reflective learners' speaking ability.

$H_0$4. Attending speaking skill lessons through mobile-mediated shadowing has no significant impact on Iranian impulsive EFL learners' speaking ability.

$H_0$5. Attending speaking skill lessons through mobile-mediated shadowing has no significant impact on Iranian reflective EFL learners' speaking ability.

$H_0$6. There is not any statistically significant difference between the impacts of attending speaking skill lessons through mobile-mediated shadowing on Iranian impulsive and reflective learners' speaking ability.

Testing the First Null Hypothesis Related to CALL/Impulsive Group

The first null hypothesis of the study aimed at investigating the effect of attending speaking skill lessons through computer-mediated shadowing on the impulsive learners' speaking ability. To investigate the first hypothesis, normal distribution of the data had to be checked as shown in Table 1.

Table 1
Kolmogorov-smirnov normality distribution for the four groups

	Statistic	df	Sig.
PRE-CALL + shadowing + impulsive	.156	25	.118
POST-CALL + shadowing + impulsive	.137	25	.200
PRE-CALL + shadowing + reflective	.173	25	.056
POST-CALL + shadowing + reflective	.113	25	.200
PRE-MALL+ shadowing + impulsive	.170	25	.061
POST-MALL+ shadowing + impulsive	.142	25	.200
PRE-MALL + shadowing + reflective	.146	25	.200
POST-MALL + shadowing + reflective	.144	25	.200

Table 1 shows *p* values for the pre- (*Sig* = .118) and post-tests (*Sig* = .200) of speaking ability for the first experimental group. Similarly, *p* values for both the pre- and post-tests of speaking ability for the reflective learners who underwent computer-mediated shadowing included as (*Sig* = .256, .200). The same values for the pre- and post-tests of the third and fourth experimental groups were .061, .200, .200, and .200, respectively. It can be observed that all *p* values for the four groups were more than .05, which verified the assumption of data normality distribution, which acknowledged running parametric tests of paired and independent samples t-tests. Table 2 provides descriptive statistics for the pre- and post-test scores of speaking ability for the learners in the first experimental group.

Table 2
Descriptive statistics for the pre- and post-tests of computer impulsive group

	Mean	N	Std. Deviation	Std. Error Mean
POST-CALL + shadowing + impulsive	56.16	24	3.313	.663
PRE-CALL + shadowing + impulsive	52.84	24	3.448	.690

As to Table 2, the impulsive learners who were provided instruction through computer-mediated shadowing could improve their speaking ability form the pre-test (*M* = 52.84; *SD* = 3.44) to the post-test (*M* = 56.16; *SD* = 3.13). Table 3 shows inferential analysis of the pre- and post-tets' scores.

Table 3
Paired Samples T-Test for Pre- and Post-Tests of computer impulsive group

				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
(POST-CALL + shadowing + impulsive) – (PRE-CALL + shadowing + impulsive)	3.320	.945	.189	2.930	3.710	17.563	24	.000

Table 3 shows that there was a significant difference between the pre- and post-tests of the impulsive learners regarding their speaking ($t(24) = 17.56$; $p = .00<.05$). In other words, computer-mediated shadowing had a significant impact on Iranian impulsive EFL learners' speaking ability, which denoted the rejection of the first null hypothesis of the study.

Testing the Second Null Hypothesis Related to CALL/Reflective Group

The second null hypothesis of the study examined the effect of attending speaking skill lessons through computer-mediated shadowing on the reflective learners' speaking ability. Table 4 illustrates descriptive statistics for the pre- and post-test scores of speaking for the reflective learners in the second experimental group.

Table 4
Descriptive statistics for the Pre- and Post-Tests of computer reflective group

	Mean	N	Std. Deviation	Std. Error Mean
POST-CALL + shadowing + reflective	61.04	26	3.541	.708
PRE-CALL + shadowing + reflective	53.00	26	3.428	.686

As shown in Table 4, the reflective learners who were exposed to computer-mediated shadowing could improve their speaking form the pre-test (*M* = 53.00; *SD* = 3.42) to the post-test (*M* = 61.04; *SD* = 3.54). In order to inferentially analyze mean scores from the pre- to the post-test, paired samples t-test was run as in Table 5.

Table 5
Paired samples T-Test for Pre- and Post-Tests of computer reflective group

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
(POST-CALL+ shadowing+ reflective)– (PRE-CALL+ shadowing+ reflective)	8.040	1.881	.376	7.263	8.817	21.366	24	.000

Table 5 indicates that a significant difference was found between the pre- and post-tests of the reflective learners regarding their speaking ability ($t(24) = 21.36$; $p = . .00<.05$), which demonstrated the rejection of the second null hypothesis of the study.

Testing the Third Null Hypothesis Related to the Difference Between CALL/Impulsive and CALL/Reflective Groups

The third objective of the study examined the difference between the effects of attending speaking skill lessons through computer-mediated shadowing on impulsive versus reflective learners' speaking ability. Table 6 presents the descriptive data for the first and second groups' post-tests of speaking.

Table 6
Descriptive statistics for the speaking Post-Tests of computer impulsive and reflective groups

	N	Mean	Std. Deviation	Std. Error Mean
group1	24	56.16	3.313	.663
group2	26	61.04	3.541	.708

Descriptive statistics for the speaking post-tests of the two groups in Table 6 show almost a large difference between the two since the reflective learners who were exposed to computer-mediated shadowing, i.e., the second experimental group ($M = 61.04$; $SD = 3.54$) performed better than the impulsive learners who underwent computer-mediated shadowing, i.e., the first experimental group ($M = 56.16$; $SD = 3.31$). Table 7 presents the inferential statistics for the speaking scores of the two groups on the post-test.

Table 7
Independent samples T-Test for the speaking Post-Tests of computer impulsive and reflective groups

	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
Equal variances assumed	0.16	0.92	-5.032	48	.000	-4.880	.970	-6.830	-2.930
Equal variances not assumed			-5.021	48	.000	-4.880	.969	-6.828	-2.829

As shown in Table 7, the significance level is less than .05 ($p = .000<.05$), demonstrating that there exists a significant difference between the first experimental group and the second one (mean difference = 4.88) concerning their speaking, leading to the rejection of the third null hypothesis of the study.

Testing the Fourth Null Hypothesis Related to MALL/Impulsive Group

The fourth null hypothesis of the study examined the effect of attending speaking skill lessons through mobile-mediated shadowing on the impulsive learners' speaking ability. Table 8 shows descriptive statistics for the pre- and post-test scores of speaking ability for the learners in the third experimental group.

Table 8
Descriptive statistics for the Pre- and Post-Tests of mobile impulsive group

	Mean	N	Std. Deviation	Std. Error Mean
POST-MALL+ shadowing + impulsive	56.80	24	3.884	.777
PRE-MALL+ shadowing + impulsive	53.28	24	3.736	.747

As to Table 8, impulsive learners who were provided with speaking instruction through mobile-mediated shadowing could improve their speaking ability form the pre-test (M = 53.28; SD = 3.73) to the post-test (M = 56.80; SD = 3.88). In order to inferentially measure the mean development from the pre- to the post-test, paired samples t-test was run as in Table 9.

Table 9
Paired samples T-Test for Pre- and Post-Tests of mobile impulsive group

				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
(POST-MALL+ shadowing + impulsive) – (PRE-MALL+ shadowing + impulsive)	3.520	1.295	.259	2.986	4.054	13.592	24	.000

Table 9 shows a significant difference between the pre- and post-tests of the impulsive learners regarding their speaking ($t(24) = 13.59$; $p = .00<.05$). In other words, mobile-mediated shadowing had a significant impact on Iranian impulsive EFL learners' speaking ability, which acknowledged the rejection of the fourth null hypothesis of the study.

Testing the Fifth Null Hypothesis Related to MALL/Reflective Group

The fifth research question of the study examined the effect of attending speaking skill lessons through mobile-mediated shadowing on the reflective learners' speaking ability. Initially, Table 10 indicates descriptive statistics for the pre- and post-test scores of speaking for the Mobile-Assisted Reflective learners.

Table 10
Descriptive statistics for the Pre- and Post-Tests of mobile reflective group

	Mean	N	Std. Deviation	Std. Error Mean
POST-MALL + shadowing + reflective	59.64	26	4.367	.873
PRE-MALL + shadowing + reflective	53.40	26	3.830	.766

As presented in Table 10, the reflective learners who underwent mobile-mediated shadowing could improve their speaking form the pre-test (M = 53.40; SD = 3.83) to the post-test (M = 59.64; SD = 4.36). Inferential analysis of the mean scores through paired samples t-test was run in Table 11 below.

Table 11
Paired Samples T-Test for Pre- and Post-Tests of Mobile Reflective Group

				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
(POST-MALL + shadowing + reflective)-(PRE-MALL + shadowing + reflective)	6.240	2.505	.501	5.206	7.274	12.457	24	.000

Table 11 indicates that there was a significant difference between the pre- and post-tests of the reflective learners regarding their speaking ability ($t(24) = 12.45$; $p = . .00<.05$), which led to the rejection of the fifth null **hypothesis of the study.**

Testing the Sixth Null Hypothesis Related to the Difference Between MALL/Impulsive and MALL /Reflective Groups

The sixth research question of the study investigated the difference between the effects of attending speaking skill lessons through mobile-mediated shadowing on impulsive versus reflective learners' speaking ability. Table 12 depicts the descriptive data for the MALL/Impulsive and MALL /Reflective groups' post-tests of speaking.

Table 12
Descriptive statistics for the speaking Post-Tests of mobile impulsive and reflective groups

	N	Mean	Std. Deviation	Std. Error Mean
Group3	24	56.80	3.884	.777
Group4	26	59.64	4.367	.873

Table 12 shows almost a large difference between the two groups since the reflective learners who were exposed to mobile-mediated shadowing, i.e., the fourth experimental group ($M = 59.64$; $SD = 4.36$) performed better than the impulsive learners who received mobile-mediated shadowing, i.e., the third experimental group ($M = 56.80$; $SD = 3.88$). Inferential statistics for the speaking scores of the two groups on the post-test is provided in Table 13.

Table 13
Independent samples T-Test for the speaking Post-Tests of mobile impulsive and reflective groups

	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
Equal variances assumed	0.19	0.93	-2.430	48	.019	-2.840	1.169	-5.190	-.490
Equal variances not assumed			-2.428	48	.019	-2.840	1.169	-5.188	-.489

Table 13 reveals that the significance level is less than .05 ($p = .000<.05$), revealing a significant difference between the third experimental group and the fourth one (mean difference = 2.84)

concerning their speaking. In other words, independent samples t-test revealed that there was a significant difference between the effects of mobile-mediated shadowing on Iranian impulsive and reflective learners' speaking ability, resulting in the rejection of the sixth null hypothesis of the study.

DISCUSSION, CONCLUSION AND SUGGESTIONS

The current research was an attempt to investigate the effects of computer- and mobile-mediated shadowing on impulsive and reflective learners' speaking ability. The results of the study revealed that CALL and MALL mediated shadowing resulted in the impulsive and reflective learners' significant improvement in speaking. However, reflective learners in both CALL and MALL mediated shadowing groups significantly outperformed the impulsive learners.

Attention to target language features or, more specifically, noticing has been a significant area of research in SLA as researchers have reported that raising L2 learners' consciousness to the target language features positively affects their L2 acquisition (Andrews, 2007; as cited in Mishima & Cheng, 2017). The positive impact of the mobile and computer-mediated shadowing activity reported in this study may be related to participants' increased attention to the different features of their own and model speeches.

The positive effects of the integration of shadowing with CALL and MALL might be due to the fact that this approach empowers learners by providing diversified resources, individualized learning opportunities, and continuous practice. For educators, it represents an innovative pedagogical tool to engage students and facilitate effective language learning (Xiuzhen & Keat, 2023).

The present study on the one hand, found empirical support to the studies of Chau (2021); Kulusaklı (2022); Mittal (2015), and Pasarıbu & Wulandarı (2021) who concluded that learning through technology-mediated instruction can results in learners' active involvement in the language learning process, leading to their improvement in speaking skill. Findings can also be in alignment with Fathi and Ebadi (2020) and Tran's (2021) studies by highlighting the fact that technological devices were the most preferred tools for foreign language learning, which demand more attention to be paid to the role of technology-mediated instruction and computer and mobile tools to be consciously applied at the service of language teaching and learning more productively.

On the other hand, the results of this study were in agreement with the findings of researchers such as Yavari and Shafiee (2019) and Zakeri (2014) who strongly concurred that shadowing can make the instruction more meaningful and foster learners' autonomy in language learning. It can be inferred that shadowing can be learner-centered since practice is done to help the learners own the learning environment. It can also be argued that shadowing simulates cooperative learning environment for learners, resulting in their communication achievement (Hamada, 2012). As posed by Foote and McDonough (2017), technology-mediated shadowing can help learners to develop their speaking within a communicative and stimulating learning environment that triggers their interaction.

Regarding the difference between impulsive and reflective learners' performance within technology-mediated shadowing through CALL and MALL, reflective learners were found to outperform the impulsive ones concerning their speaking ability. The findings of the study were in alignment with Motallbezadeh and Samadi's (2017) argument that reflective learners are thought-oriented and try to elaborate on the details and patiently carry out the tasks, in contrast with impulsive learners who are hasty in initiating the classroom activities and answering to the teacher's questions, which might result in having less concentration.

Finally, it was concluded that using technology-mediated shadowing through CALL and MALL acted as the mediating tool to help EFL learners specially the reflective ones to significantly develop their speaking ability. As to socio-cultural theory, learners can be armed with scaffolding through CALL and MALL to increase their level of speaking in a second language through the advantageous

potentials of these technologies. However, the study showed that the beneficial effects seemed to be stronger among reflective EFL learners that the impulsive ones.

Implications of the Study

The practical contributions of the study were as follows:

CALL and MALL-mediated shadowing needs to be acknowledged as an appropriate procedure to practice speaking ability, which appears to be beneficial for both EFL students as well as teachers. Teacher educators are also responsible for raising teachers' awareness of the techniques of shadowing integrated with technological devices

As EFL instructors are always looking for effective means to promote speaking in a second language, technology-mediated shadowing can help them to accomplish their goals by guiding the students to be more involved in the classroom, which makes the atmosphere much more satisfying for language learners; specially the reflective ones.

Finally, awareness-raising activity through teacher education programs can be conducted in order to provide sufficient instructions for teachers to effectively use CALL and MALL-mediated shadowing in the classroom and be familiar with the possible challenges they might encounter in the learning environment.

Suggestions for Further Research

Regarding the limitations of the current study, the following recommendations deserve thoughtful attention:

First, this study was conducted with the participation of intermediate learners. It is recommended to consider other proficiency groups in further research. Secondly, learners' and teachers' perceptions about the effectiveness of computer- and mobile-mediated shadowing on the learners' speaking can be taken into account in a further study. Thirdly, it is suggested to conduct qualitative research and interpretively examine the effect of technology-mediated shadowing through CALL and MALL on the learners' speaking. Fourthly, this study was done with small number of participants. Future research can be done with larger samples to generalize the findings. Fifthly, this study only concentrated on learners' impulsivity and reflectivity, while it is recommended to explore other personality types as well. Sixth, one of the limitations of the study was, not including a control group; due to some administrative limitations in the institutions in which the study was conducted. Later studies can be conducted through including a control group to promote the validity of the study and make it more accurate. Last but not least, a further study can be done with the utilization of other technological devices.

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