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Comparative Effects of Motivational, Metacognitive, and Computer-based Scaffolding Strategies on Improving Iranian EFL Learners' Writing

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Abstract

Scaffolding as an instructional strategy significantly contributes to learning development. However, there is a lack of studies assessing the comparative effects of various scaffolding strategies. Drawing on Vygotsky's sociocultural theory, the present study intended to evaluate the effects of motivational, metacognitive, and computer-based scaffolding on Iranian intermediate EFL learners' writing. In this quasi-experimental study, sixty male and female intermediate EFL learners aged 14 to 23 were chosen through convenience sampling from the Jahad language center in Tehran, Iran. They were tested on Preliminary English Test (PET) and were randomly assigned to three equal groups. The IELTS writing test was used as a pre-test and post-test. Learners received a scaffolding instruction package on writing. A statistically significant improvement in the participants' post-test writing scores was observed in all groups, and motivational scaffolding was the most effective strategy in developing the writing skill of EFL learners. The results could have pedagogical implications for language teachers, learners, and syllabus designers.

Keywords: Computer-based scaffolding; Metacognitive scaffolding; Motivational scaffolding; Writing ability

INTRODUCTION

Writing is a productive skill that is considered a method of learning language forms and a means of conveying a message (Chastain, 1988). Communication in such a manner is more concrete than oral communication, with less margin for mistakes. Writing as a recursive, nonlinear method comprises different stages such as creating ideas, structuring, drafting, revising, and editing (White & Arndt, 1991). Drafting, as mentioned by Silva and Matsuda (2002), can be considered a conflict for writers. Parameters such as the writer's self-image and concern about writing can make the writing task constraining, sometimes causing writing inhibition, usually called writer's block. Foreign language teachers use a variety of strategies to help language learners overcome these challenges and simplify their writing process.

Over the decades, teachers' understanding of reading has expanded, and they are changing their role as informants and creators of student-centered and knowledge-based classes (Bransford, Brown, & Cocking, 2000). This change has opened additional screened windows. In line with these lines, in such a way, it is often argued that the use of scaffolding, as

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discussed in Vygotsky's Zone of Proximal Development (ZPD), adds a practical approach to language learning (Vygotsky, 1987).

Scaffolding is an intervention that can be developed in various ways (conceptual, metacognitive, strategic, motivational, and computer-based) and is exceptionally effective (Belland, Walker, Kim, & Lefler, 2017). Motivational scaffolding involves "strategies created to preserve or promote the learner's motivational condition, such as affection or enthusiasm" (Alias, 2012, p. 138) and attempts to favorably influence factors like students' awareness of autonomy and self-efficacy (Belland et al., 2017).

Metacognitive scaffolding offers "assistance, encouragement, hints, prompts, and recommendations concerning the component, materials, and strategies pertinent to problem-solving and learning management (Alias, 2012, p. 138). In computer-based scaffolding, software products are used that employ such strategies as question cues, expert/peer modeling, and data handling tools to enhance and optimize learners' conceptual comprehension, strategy use, and awareness of procedures (Belland, 2014). It also helps learners plan, organize, and use related mental functions before accomplishing those activities independently.

Hogan and Pressley, (1997) have identified eight scope teaching principles used as general guidelines in this study. A collage-based instruction should organize students, create a shared goal, embrace students' needs and fears, provide appropriate assistance, maintain and follow a policy, provide feedback, manage failures and risks, and support integration, independence, and generalization.

In addition, other aspects of scaffolding-based teaching include good learning habits, good classroom management, supervision, problem-solving tests using learning strategies, improving student self-esteem, increasing the value of activities and learning, and developing students' hope of success (Raphael, Pressley, & Mohan, 2008).

Scaffolding strategy has been an issue in SLA since its appearance in the literature. However, there is a paucity of studies on the comparative effects of different scaffolding strategies (motivational, metacognitive, and computer-based scaffolding), particularly in an EFL context like Iran. The present study attempted to address the research gap in the area of scaffolding by answering the following research questions:

Q1. *Does computer-based scaffolding significantly affect Iranian intermediate EFL learners' writing ability?*

Q2. *Does metacognitive scaffolding significantly affect Iranian intermediate EFL learners' writing ability?*

Q3. *Does Motivational scaffolding significantly affect Iranian intermediate EFL learners' writing ability?*

Q4. *Which type of scaffolding has a more significant effect on Iranian intermediate EFL learners' writing ability?*

LITERATURE REVIEW

Sociocultural Theory

One of the increasingly and commonly used strategies to support learners' language learning is scaffolding, which is derived from sociocultural theory (SCT) and Vygotsky's Zone of Proximal Development (ZPD). From this perspective, SCT is considered from three equally important angles by him: firstly, he highlights the importance of development through social interaction. Secondly, the social and cultural context within which individuals are in interaction with one another is regarded as crucial, and finally, he surely believes in the function of signs and symbols in his SCT to assist individuals in becoming successful during development. (Vygotsky, 1987; Williams & Burden, 2002). To this end, some elements are regarded as determining in clarifying the notion of SCT better: ZPD, mediation, and imitation (Vygotsky, 1987). Holzman (2016) captures ZPD through three different perspectives: individual, dyadic, and collective. For ZPD to be dyadic, it is its collective nature, which is the focus of attention.

Scaffolding

Scaffolding techniques are built on theory, strategy, metacognitive, and motivating scaffolding (Belland, Kim, & Hannafin, 2013).

Encouraging scaffolding aims to increase students 'motivation toward targeted subjects, determined by their desire to initiate an effort to accomplish learning activities (Tuckman, 2007). This goal can be achieved by increasing students' expectations of achievement, understanding the importance of targeted completion, self-awareness, ideas of ultimate goals, the ability to control academic emotions, and ideas of belonging to others. Strategies for this goal include determining acquisition value, supporting a productive adjective, and developing an appropriate challenge perspective (Belland et al., 2013). There are three types of engagement — behavior, perception, and emotion (Lee & Shute, 2010). All three types of engagement can be enhanced by using stimulating scaffolding.

Metacognitive scaffolding encourages students to test their thinking (Cuevas, Fiore, & Oser, 2002). Key metacognitive mechanisms include job description and planning, monitoring and management, and meditation (Quintana, Zhang, & Krajcik, 2018). The planning process provides students with planning materials and motivates them to explore the value of the planning process. It can guide the monitoring of a person's progress in questioning activity based on a set of principles (Zhang & Quintana, 2012) and encourage students to explore ideas and consequences created ethically (Quintana et al., 2018).

Compared to solid scaffolding, computer-based scaffolding is a flexible and highly adaptable tool. Computer-based screens are often connected to connect students with other students once, or in context. By using a computer-based scaffolding, students have permanent access supported by scaffolding provided by a computer program. They gain access to teacher scaffolds when a teacher comes to their desks (van de Pol, Volman, & Beishuizen, 2010).

Researchers disagree with the definition and scope of scaffolding, although there is a growing interest in using scaffolding in their studies. Therefore, the term is often used approximately (Hammond & Gibbons, 2005). Numerous studies, which compared the use, and non-use of scaffolding in language teaching, have shown that scaffolding can help students with a variety of learning objectives (Ge & Land, 2003). Zarei and Alipour (2020) investigated the impact of three scaffolding strategies compared to three types of tracing for 120 EFL mid-level students. The results showed that widespread scaffolding and interactive shadowing were the most effective techniques. There was also a big difference between the shadow techniques and scaffolding that harvested scaffolding techniques.

Mansouri and Mashhadi Heidar (2019) hired scaffolding peers and teachers using the process method in an advanced technology environment using the Telegram app. The study subjects were 120 EFL students selected according to their performance on a sample copy of the Oxford Placement Test (OPT). The results showed that both peers and teachers had a significant impact on students. However, there is no significant difference between scaffolding for peers and teachers.

Tam (2017) found that the application of customized scaffolding instructions according to the needs of the students helped them to acquire Putonghua learning. It provides students with an opportunity to become familiar with Putonghua's instructions, strengthens mental development by linking students' prior knowledge to more instruction, integrates students' cultural and historical awareness, promotes positive attitudes about moving from their mother tongue to strengthening students' motivates, and stimulates peer cooperation and collaboration among students.

Mortazavi, Jafarigohar, and Roohi (2017) examined the impact of planning and construction problems on the Iranian English sample of different students by sharing metacognition in writing skills. They found that providing work-based models and explanations or problem-solving for students could improve students' literacy skills.

In a quasi-experimental study, Ak (2016) examined the impact of technology-based scaffolding on online asynchronous online discussion. He found that this strategy improves student work habits and leads to work-related learning activities.

Santoso (2010) investigated the impact of scaffolding on a mixed learning environment that incorporates both online communication and face-to-face writing for foreign language learners. Cutting techniques were developed and used in the classroom. The results showed that effective student writing was improved, and students learned independence at the end of the study.

Tuckman (2007) examined the effect of scaffolding on the 'traditional' approach to grade education. The results showed that for retiring students, the lack of a remote reading structure may be difficult for them, to have a better function in a version organized with a dynamic scaffolding than traditional.

METHODS

Participants

Sixty Iranian intermediate students (23 males and 37 females), ranging in age from 14 to 23, were selected by taking a sample of a large sample of 80 students. All participants were in a moderate level of expertise, based on the assessment of English knowledge (i.e., PET), which they acquired before undertaking writing tasks. The selected participants were randomly assigned to three groups, including motivational, metacognitive, and scaffolding-based computer groups, each consisting of 20 students. The students' native language was Persian, and they did not know any foreign language besides English. They received scaffolding instructions and their general education in their class. In addition, a group of 30 Iranian Intermediate EFL students with the same characteristics and the same level of expertise as the target sample participated in the research study. Also, two university professors assessed the validity of the exam content, and two IELTS teachers at the Jahad language center evaluated participants' writing scores.

Instruments

The following two instruments were used in the current study:

Preliminary English Test (PET)

According to Cambridge English Language Assessment, PET is a standard English language examination to investigate the learners' general English proficiency. To ensure that learners' proficiency level was intermediate, they were given the piloted sample PET developed by Cambridge ESOL to homogenize the participants concerning their language proficiency at the beginning of the study. PET consisted of four main parts of reading, listening, writing, and speaking. As the learners' writing skill was the focus of the present study, only the writing part of the PET was run. The writing part of the PET consisted of 3 different sections.

Part one required learners to complete the sentences. The second part consisted of writing an informal letter of 35 to 45 words. In the third part, the learners should write 80 to 100-word pieces of writing. The content validity was approved by two university professors with a specialization in L2 teaching. The PET rating scale for the writing part named the General Mark scheme designed by Cambridge was used in this study to score the second and third parts of the writing.

International English Language Testing System (IELTS)

The writing phase of the IELTS test was used as a pre-test before treatment sessions and as a post-test after the 20th session. The writing section consisted of two activities, requiring students to write at least 150 words for Activity 1 and not less than 250 words for Activity 2. In Group 1, participants were introduced to a specific situation and were required to write a book. asking for information or explaining a problem. The character can be personal or formal in style. In Activity 2, they had to write an essay about an idea, conflict, or issue**.**

Two university professors assessed the validity of the test content and endorsed the test content for the intended purposes. A positive assessment environment was improved by providing adequate time, answering all questions before taking the test, and preventing students from cheating to ensure complete reliability. According to IELTS band descriptions for writing activities, two teachers with IELTS experience independently lead students' writing performance. The evaluation was based on a set of written workgroups in

achieving task/response, coherence, coherence, word resource, grammar, and accuracy.

Furthermore, in terms of materials, all three groups received instruction based on units 1-5 of Top Notch 2 (Saslow & Ascher, 2018) throughout the course, which lasted for 40 hours of learning. The course is appropriate for intermediate-level learners of English. Each unit took an average of four sessions to be taught entirely. Twenty minutes of each session was allocated for developing writing through scaffolding strategies.

Procedure

Data Collection Procedure

A pilot study was administered to 30 EFL learners who were similar to the participants of the main study to determine the feasibility of the main study and measure the reliability of the instruments. The central part of the study was started by administering the PET to homogenize the participants at the outset of the study. Then the participants were randomly assigned to the three experimental groups. The second stage of the study was the administration of the IELTS writing test as the pre-test. The pre-test evaluated the participants' knowledge of writing before the treatment sessions. Two raters scored each item independently, according to the IELTS rating scale. Then, the treatment sessions were initiated. The participants of the study received scaffolding instruction along with their standard instruction in their general English course.

In the computer-based scaffolding group, writing modules included the multimedia presentation of instructional content using the *Active Teach* Digital Student's Book, which was interactive digital software to help the learners to write about a specific topic in their regular program. It consists of different tasks, which function as scaffolding. The software utilizes text, graphics, video, and audio elements to provide maximum assistance for the learning process. Learners had freedom in writing in terms of time and classroom limitations. The participants were provided with a handout containing an ID and password required for entering the system, topics of writing, assigned time and date for the submission of each piece of writing, and several channels of communication that they could use to ask about the possible technical problems during the study period. The participants were informed that they could discuss anything in the forum related to the process of writing. The participants had to write a minimum of 300 words about a particular subject weekly. They were informed that they could write it from any computer, at any time, which gave students sufficient time to complete their writings, free of class-meeting restraints. When learners submitted written work, their writings were corrected in terms of content and meaning, observations were annotated back into the text, and learners were asked to return their revised texts. The learners could see all their former work with highlighted comments to permit them to be oriented in a continuous process of writing progression.

In the metacognitive scaffolding group, planning, monitoring, and evaluating as central elements of metacognitive scaffolds were used to assist learners in their writing tasks. In the planning stage, 10 minutes of each session was spent explaining the purpose of instruction and describing the principles of essay writing, such as addressing the issues, raising issues, logical thinking, and assessing others' disputes regarding their writing. Then, the learners received a topic for writing. Regarding monitoring, the teacher also behaved as the mediator, inspected the learners separately, and gave advice as required. The participants listened and made amendments when needed. They were also required to write down the essential tips explained in the class and prepare a report of that day's work for the teacher. The teacher acted as the timekeeper and controlled everything that occurred in the class operations. The evaluation stage was the crucial part that compelled the participants to read meticulously because they extracted the critical point and write the core message in their texts. Then, the learners were requested to explain their viewpoints and gave their writing essays.

In the motivational scaffolding group, interesting topics were selected for writing tasks that covered different areas of interest. The topics ranged from strange experiences

and violence in movies to choosing a hotel to social problems. This was done to ensure that all participants could use their current vocabulary knowledge and their current proficiency to deal with them. Before completing the task, some questions were asked by the teacher and peers to prepare the learners for writing and to help reduce the stress of the students and boost their confidence. The preparation phase is very influential in enhancing learners' motivation (Wijetunge, Jayasinghe & Weerarathne, 2016). Then, the learners were exposed to some example texts extracted from the internet to motivate them to write. They were asked to read carefully, and then some negotiations proceeded among the learners and the learners and the teacher. The learners' seats were put in a circle to create a more relaxed atmosphere and make negotiations more interactive. They were then required to write on the subject based on their gained topical knowledge. The participants' writing samples were then reflected on, and the gaps (linguistic, functional, and organizational) were highlighted by the teacher in such a way that the correct modeling of each mistake was presented to the participants in a friendly manner regarding situational use of the concepts that he used in his writing samples. Finally, the learners were asked to write and play an imaginative role in each common topic. Then, participants' writing samples were marked by the teacher, and they decided individually what types of mistakes they made.

In the end, participants of all groups had to take the post-test of the study. Their performance on the post-test was compared to find the differences.

Data Analysis Procedure

To pursue the purpose of the study in finding the effects of motivational, metacognitive, and computer-based scaffolding on improving intermediate Iranian EFL learners' writing, a quantitative pre-test-treatment-post-test quasi-experimental research method was used. So, the independent variables were three types of scaffolding strategies, and the dependent variable included learners' writing ability.

Descriptive statistics such as the mean, minimum and maximum scores, standard deviations, skewness, and kurtosis were determined to provide general information concerning the results of the tests. Pearson correlation was used for inter-rater reliability analysis to see the extent to which two sets of participants' scores on pre-test and post-test were correlated. SPSS version 25.0 was used for inferential statistics, and different statistical analyses were performed to answer the research questions.

To ensure no significant difference between the groups regarding their language proficiency at the beginning of the study, a one-way ANOVA was performed. Three paired sample t-tests were conducted to find the effects of motivational, metacognitive, and computer-based scaffolding on Iranian intermediate EFL learners' writing ability. A two-way ANOVA was performed regarding the writing scores of learners in the pre-test and post-test across the three groups of the study to find which type of scaffolding is more operative in improving Iranian intermediate EFL learners' writing, … .

RESULTS

Piloted PET was run on 80 EFL learners at the start of the study. The descriptive statistics of the PET scores were obtained. A relatively large standard deviation (SD=13.98) revealed that the distribution of the achieved scores was not normal. The participants whose scores did not fall between one standard deviation below and above the sample mean were omitted to homogenize the scores. Twenty participants fell within this range; therefore, they were excluded from the final analysis.

Analysis of the Pre-test Results

The selected participants were randomly assigned to three groups: motivational (n=20), metacognitive (n=20), and computer-based (n=20) scaffolding. Then, the writing IELTS test was performed as the pre-test. Two IELTS teachers rated the participants' performances independently. Pearson correlation test was performed **t**o gauge the inter-rater reliability of pre-test scores gained by two raters in the three groups. Table 1 shows the results.

Table 1
Inter-rater Reliability of the Pre-test Scores in All Groups

	Pearson Correlation	Sig. (2-tailed)
Pre-test (computer-based)	.907**	.000
Pre-test (Metacognitive)	.912**	.000
Pre-test (Motivational)	.935**	.000

***Correlation is significant at the 0.01 level (2-tailed).*

There was a significant correlation between the scores of the pre-test rated by two raters in all groups. So, the inter-rater reliability of the writing scores on the pre-test was highly significant ($p < 0.001$). Table 2 demonstrates the mean (arithmetic average) scores of the pre-test given by the two raters for all groups.

Table 2
Mean Pre-test Scores Given by the Two Raters

	N	Mean	Std. Deviation
Pre-test (computer-based)	20	3.14	.741
Pre-test (Metacognitive)	20	3.15	1.612
Pre-test (Motivational)	20	3.15	1.363

The one-way ANOVA was used to make sure that there was no significant difference among the groups at the study's outset. The results are shown in Table 3.

Table 3
One-Way ANOVA on the Pre-test Scores in All Groups

ANOVA					
Pre-test					
	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
Between Groups	1.131	2	.239	.180	.958
Within Groups	155.748	58	1.369		
Total	156.990	60			

The results showed no significant difference among the three groups regarding their performance on the pre-test ($F = .180$, $p > 0.05$).

Analysis of the Post-test Results

After the treatment, the participants received the writing IELTS test as a post-test. Inter-rater reliability of scores obtained by two raters on the post-test for all groups was determined using the Pearson correlation test. Table 4 provides the results of the statistical analyses.

Table 4
Inter-rater Reliability of the Post-test Scores in All Groups

	Pearson Correlation	Sig. (2-tailed)
Post-test (computer-based)	.979**	.000
Post-test (metacognitive)	.965**	.000
Post-test (motivational)	.986**	.000

** *Correlation is significant at the 0.01 level (2-tailed).*

The results showed a substantial association between the post-test scores obtained by two raters in all groups. So, the inter-rater reliability of writing scores on the post-test for all groups was highly significant ($p<0.001$). The mean (arithmetic average) post-test scores given by the two raters across writing skill is shown in Table 5.

Table 5
Mean Post-test Scores Given by the Two Raters

	N	Mean	Std. Deviation
Post-test (computer-based)	20	4.50	1.192
Post-test (Metacognitive)	20	4.65	1.225
Post-test (Motivational)	20	5.20	1.777

To find the effect of computer-based scaffolding on Iranian intermediate EFL learners' writing, the paired samples t-test was conducted between the learners' pre-test and post-test scores. The results are demonstrated in Table 6.

Table 6
Paired Samples T-test on the Pre-test and Post-test Scores in the Computer-based Scaffolding Group

Paired Samples Test

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Post-test (computer-based) - Pre-test	1.44	.49098	.12013	1.19675	1.70234	12.684	18	.000

As seen in Table 7, the difference between learners' pre-test and post-test writing scores was significant ($t = 12.68$, $p < .001$) in the computer-based scaffolding group in a manner that the writing capacity of the learners was enhanced by using computer-based scaffolding.

Results for the Second Research Question

The paired-samples t-test was conducted between the learners' pre-test and post-test scores to find the effect of metacognitive scaffolding on Iranian intermediate EFL learners' writing. The results are shown in Table 7.

Table 7
Paired Samples T-test on the Pre-test and Post-test Scores in the Metacognitive Scaffolding Group

Paired Samples Test

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Post-test (metacognitive) - Pre-test	1.4201	.50202	.10323	1.12312	1.7121	12.654	19	.000

The results showed a significant difference ($t = 12.65$, $p < 0.001$) between the learners' pre-test and post-test writing scores in the metacognitive scaffolding group, and the writing ability of the learners was improved. Therefore, metacognitive scaffolding was effective in enhancing EFL learners' writing.

Results for the Third Research Question

Additional paired samples t-test was conducted between the learners' pre-test and post-test writing scores to measure the effect of motivational scaffolding on Iranian intermediate EFL learners' writing. The results are demonstrated in Table 8.

Table 8
Paired Samples T-test on the Pre-test and Post-test Scores in the Motivational Scaffolding Group

Paired Samples Test									
		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Post-test (Motivational)-Pre-test	2.89453	1.19567	.26935	2.29724	3.51974	10.563	18	.000

The results demonstrated a significant difference between the learners' writing scores in the pre-test and post-test ($t = 10.56$, $p < .001$). Therefore, motivational scaffolding was effective in enhancing EFL learners' writing.

Results for the Fourth Research Question

A two-way ANOVA was run to compare the pre-test and post-test scores of the learners in the three study groups to determine which type of scaffolding had a more significant impact on the writing improvement of Iranian intermediate EFL learners. The key assumptions for two-way ANOVA between groups had to be examined, including the level of measurement, independence of observations, normal distribution, and uniformity of variation. Tests of between-subjects effects were inspected to examine the potential interaction effect of different staging groups on pre-test and post-test scores. The results are shown in Table 9.

Table 9
Two-way ANOVA between the Pre-test and Post-test Scores in All Groups

Tests of Between-Subjects Effects					
Dependent Variable: Writing Test					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	140.654[a]	5	29.365	14.678	.000
Intercept	1989.990	1	1989.990	1056.872	.000
Grp	12.968	2	7.009	4.067	.028
Tests	113.074	1	113.074	61.871	.000
grp * Tests	13.449	2	6.769	3.734	.026
Error	205.940	113	1.793		
Total	2466.014	119			
Corrected Total	347.315	120			

a. R Squared = .406 (Adjusted R Squared = .380)

Table 9 shows that the effect of the interaction between learners' pre-test and post-test writing scores ($F = 3.73$, $p < .001$) was statistically significant in pre-test and post-test writing. There was a significant difference between the scores of the motivational, metacognitive, and computer-based scaffolding groups. Therefore, the use of different types of scaffolding was effective in developing the writing ability of EFL learners. LSD post-hoc multiple range test was performed to locate the source of the difference. The results are shown in Table 10.

Table 10
Multiple Comparisons for Learners' Writing Ability

Multiple Comparisons
Dependent Variable: Writing Test
LSD

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Computer-based Scaffolding	Metacognitive Scaffolding	-.1356	.29678	.623	-.7197	.4867
	Motivational Scaffolding	-.7459*	.29678	.056	-1.3697	-.1883
Metacognitive Scaffolding	computer-based Scaffolding	.1356	.29678	.683	-.4677	.7307
	Motivational Scaffolding	-.6349*	.29678	.039	-1.2857	-.0493
Motivational Scaffolding	computer-based Scaffolding	.7459*	.29678	.019	.1683	1.3697
	Metacognitive Scaffolding	.6349*	.29678	.039	.0528	1.2517

Based on observed means.
The error term is Mean Square (Error) = 1.825.
*. *The mean difference is significant at the 0.05 level*

As Table 10 indicates, subsequent evaluations using the LSD test showed that the mean score for writing in the motivational staging group was significantly different from those in the computer-based and metacognitive staging groups. However, the computer-based scaffolding group's performance was not meaningfully different from that of the metacognitive scaffolding group.

Figure 1 above shows the difference between the pre-test and post-test groups. It indicates, that the motivational-based scaffolding group outperformed the other two groups on the writing test.

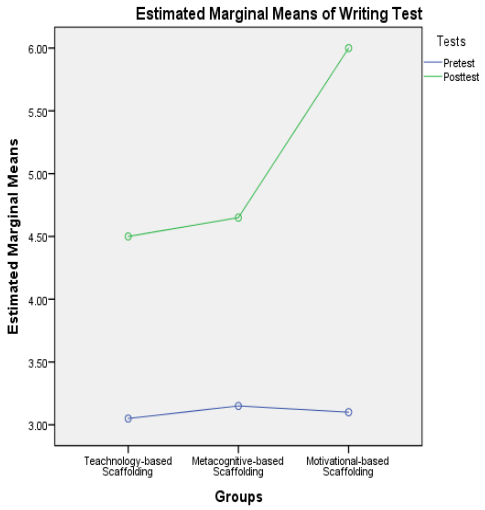

Figure 1
The difference among groups in the pre-test and post-test writing scores

DISCUSSION

Regarding the first aim of this study; that is, to explore the impact of computer-based scaffolding on the writing ability of EFL learners, it can be inferred from the results that learners' writing was developed when they used computer-based scaffolding. Computer-based scaffolding assisted learners in increasing their attention and receiving immediate feedback. Another reason for the effect of computer-based scaffolding is its flexibility, which permits the learners to select various means to receive instructional materials. In support of the studies above, it should be emphasized that integrating technology into scaffolding can lead to more beneficial learning. This view is supported by Warschauer (2006), who believes that technology combines meaningful and authentic communication into all dimensions of language learning.

This result is approved by Ak (2016), who found that computer-based scaffolds may assist students in concentrating on their tasks more, and the integration of computer-based scaffolds can presumably inspire more reflective and complex discourses. The findings of the present research are commensurate with those of Santoso (2010), who evaluated the impact of scaffolding in a hybrid-learning context on foreign language learners' writing. The

results demonstrated that learners' effective writing was enhanced. Concerning the second aim; namely, evaluating the impact of metacognitive scaffolding on intermediate EFL learners' writing, the paired sample t-test showed a statistically significant improvement in the post-test writing scores of the participants in the metacognitive scaffolding group. Like this study, the positive results of using metacognitive scaffolding as a teaching strategy have been proved in various studies (Ahmad et al., 2019; Tan & Tan, 2010). effective, language teachers must provide meaningful content with respect to reinforced writing material by providing various scaffolding strategies that guide them through the zone of proximal development (Valky, 2006). In addition, metacognitive staging involves using some metacognitive strategies such as monitoring, evaluating, and providing feedback for activities that assign learning tasks and activities between the learners' current level of ZPD and the developmental level. We do. The performance of the learners is examined to give feedback on their learning processes. In this way, learners will find themselves in control of their learning.

The findings of the current study are consistent with those of Jafarigohar and Murtazavi (2016). They showed that providing task-structuring patterns and justifications or complex cues for learners significantly improved both individual and socially shared metacognition of learners.

With respect to the third research question concerning the impact of persuasive scaffolding on the writing of Iranian intermediate EFL learners, the results revealed that using persuasive scaffolding effectually developed EFL learners' writing.

Concerning the fourth research question, the results indicated that motivational scaffolding had the most effect on intermediate EFL learners' writing. These results are in line with Tuckman (2007), who found that motivational scaffolding introduced a synergistic mechanism provoking highly passive students to stay on task and comply with the time limits. It deserves mention that on both performance measures, the highly passive students turned from the worst performers to the best performers when they received motivational scaffolding. The findings of the current study also can support those of Tam (2017), who used scaffolding instructions to fulfill the demands of students. The results showed that scaffolding fostered learners' positive attitudes towards language learning and enhanced motivation and cooperation among learners. Motivational scaffolding was used along with some supportive activities based on ZPD. In the motivational scaffolding group, the learners faced different scaffolding functions that developed in their classroom communications. Learning is an inventive activity, and as soon the learners have learned the skills, they might advance themselves to resembling conditions where they can apply what they have formerly been taught.

This study suggests integrating motivational scaffolding as a valuable strategy to mediate language learners when they are trying to do some language tasks. The obtained results were almost in support of the positive effects of integrating scaffolding components. Besides the statistics, the friendly and active atmosphere that was in the motivational scaffolding groups and students' collaboration encouraged them to participate more willingly in doing writing tasks. They were not scared of making mistakes since their teachers had monitored their mistakes and helped them to alleviate the problems.

This study has several limitations. The participants were not selected randomly. Furthermore, the sample size was small and larger samples might better analyze the effects of these three scaffolding strategies on Iranian EFL learners' writing. In addition, the participants of the study were intermediate EFL learners. They were also non-native English learners who studied in a language institute. Therefore, the range and variety of participants were also limited. These bring up some concerns regarding the universal legitimacy of the observed significance. A study with more participants must be conducted to reach more reliable and generalizable outcomes.

CONCLUSION

Motivational, metacognitive, and computer-based scaffolding improved the intermediate Iranian EFL learners' writing. Scaffolding was effective in language learning; it

smoothed the learning process by providing much support to the students in true settings, linking their contextual knowledge to the texts, and enhancing communication, discussion, and negotiation among learners. Motivational scaffolding was more helpful in developing Iranian EFL learners' writing than two other scaffolding strategies by providing situations for learners to highly participate in writing activities. In this study, some writing activities such as activating prior knowledge, teacher models, visualization, small-group work, and whole-class instruction were designed for learners to engage.

Motivational scaffolding helps EFL learners improve their learning speed, personalized training, accuracy, capability, and administration. It can provide the teachers both with the learners' existing performance level and their learning ability. They can set several separate learning plans for learners with different learning demands. It implies that learners with similar non-dynamic but different good and poor learning potential scores can be approached dissimilarly. The learner with a meager learning possibility should receive learning and information strategies such as scaffolding activities; also, the teacher can arrange separate plans for every learner. In our study, the learners' needs were determined based on their performance on the pre-test. Those who obtained lower scores on the pre-test were considered more needful, and those who received higher scores were considered less needful. An adequate volume of scaffolded teaching helped EFL learners to do their best and bridge the gaps through their zone of proximal development. To produce operative instruction through motivational scaffolding, two principles should be taken into account: the first principle is that teaching supplies aimed to reconcile personal differences should incorporate integrated tasks. Thus, we should not contemplate that specific activity will lead to an equal effect on all learners. The second principle, as explained by Chun and Plass (1996), is that the way of the administration should follow the optimal support for the learners. Thus, an instructional designer should make a sound judgment concerning which activity and teacher behavior is more suitable for an assumed learning situation. By applying motivational-based scaffolding, teachers can educate cooperative learners who can be more confident members.

Learners declined apprehension and stress and enjoyed the learning atmosphere in the motivational scaffolding group. So, policymakers can take advantage of integrating these strategies. It can assist teachers in creating a learning atmosphere, which prioritizes learners' needs rather than the grade-oriented and individualistic system. The importance of different scaffolding strategies in language learning should be considered in designing scaffolding activities. In this way, information is simple to conceive, and the cooperative learning circumstances draw the learners' attention. Therefore, the study of scaffolding should partly provide curriculum designers, program developers, and teachers with a better comprehension of what is responsible for learners' success in developing writing ability. From the perspective of learning materials, motivational scaffolding help EFL learners improve the pace of learning, collaboration with others, and reduce their stress. Syllabus designers and material developers should ponder on inspiring and relevant scaffolded activities in their instruction to boost learners' motivation to dedicate necessary energy to write.

Scaffolding is an essential and widely investigated concept, but much remains uncertain, especially in Iran. Additional studies would be necessary to uncover the effects of utilizing different scaffolding strategies on other learning skills for learners of different ages with varying levels of English language proficiency.

We recommend replicating this study with a considerable number of participants from the same background. These proposed modes of research might provide more insight into foreign language learning.

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