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Enhancing Writing Ability through Scaffolding Techniques: A Mixed-Methods Study

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ABSTRACT
The present study explored the effects of motivational, metacognitive, and technology-based scaffolding in developing Iranian English as foreign language (EFL) learners' writing ability. The participants were 60 EFL learners who were selected based on their performance on the Preliminary English Test (PET). The selected participants were randomly assigned to three equal groups. Then, they took the pretest to measure their writing ability at the beginning of the study. In the technology-based scaffolding, a software was designed by a computer technician consisting of different tasks. In the motivational scaffolding group, the instruction of writing was based on activities, which stimulated learners' motivation. In the metacognitive scaffolding group, scaffolded instruction of writing was integrated into metacognitive strategies. The participants of all groups took the posttest. At the end of the study, all participants took part in the interview. The results of statistical analyses showed that there is a significant difference among different groups in developing Iranian EFL learners' writing ability. Motivational-based scaffolding was shown to be the most effective technique in enhancing EFL learners' writing ability. The results of the interview also showed that scaffolding techniques consistently improved the writing skills of EFL students. A sufficient amount of scaffolding instructions help EFL learners to give their best in bridging the gap in their zone of proximal development. The results of this study may be useful for EFL teachers in eliminating or minimizing the counterproductive effects of traditional methods and strategies on EFL learners' behavior and learning.

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Introduction

Over the past decades, teachers' understanding of the learning was expanded and they replace their role of knowledge transmitters with creators of learner-centered and knowledge-centered classrooms (Bransford, et al., 2000). This shift has opened more widows for scaffolding. It is assumed that paying heed to nature and types of scaffolding as well as investigating their effects on EFL learners' language proficiency becomes a prerequisite for language learning.

Scaffolding is actually a bridge used to build upon what students already know to arrive at something they do not know. If scaffolding is properly administered, it will act as an enabler, not as a disabler" (Benson, 1997, p. 28). Scaffolding is operationally defined as a set of strategies that the teacher uses in order to help learners progress gradually (Benson, 1997).

Second language teachers use several techniques to help learners develop their grasp of the language. In this context, it appears to argue that the use of scaffolding as discussed in the Vygotskian Zone of Proximal Development (ZPD) adds a practical way to deal with language learning. In Vygotsky's opinion, scaffolding is a fundamental instrument of internalization and a central component of the formative movement in the ZPD (DeGuerrero & Commander, 2013). Vygotsky (1987) describes ZPD as the distance between the current developmental level regulated by individual problem-solving and the future developmental level defined by problem-solving under adult supervision or in a cooperative initiative with more competent peers. Vygotsky (1987) acknowledges that there are a few practices that can be voluntarily done by an infant so that these skills are established to be indicated as developmental outcomes. In these lines, if this is true for certain independent functions, it appears to be the same condition for various exercises produced by an infant. In such a way, the ZPD characterizes those capacities which have not yet been established, but which are apparently in the process of growth, the capabilities which come to development later on but which are in the meantime in an underdeveloped state (Vygotsky, 1987).

Alias (2012) categorized scaffolds into three major types namely, cognitive, metacognitive, and affective or motivational scaffolds. According to Alias (2012), while cognitive and metacognitive scaffolds provide assistance, support, hints, prompts, and suggestions about the content, resources, and strategies relevant to problem-solving and learning management, motivational scaffolds include techniques designed to maintain or improve the learner's motivational state, such as attribution or encouragement.

Alias (2012) stated that most studies undertaken in the field of scaffolding address cognitive and metacognitive scaffolding. It was proposed constructing motivational scaffolding through the use of tactics that elicit and reward learners' confidence and make learners' successes more clear. For the same reason, Belland, et al., (2013) and Chen (2014) emphasized on the scarcity of research on motivational scaffolds and the necessity for creating and conducting research on scaffolds that suit the motivational demands of learners. Chen (2014) emphasized the need of creating

scaffolds that not only concentrate on students' attributes such as cognitive status but also psychologic status. It was also suggested that scaffolds should be provided to motivate learners as they gain conceptual understanding. Chen (2014) drew on the notion of the zone of motivational proximal development (Brophy, 1999) and self-determination theory (Deci & Ryan, 1985) to propose the idea of developing scaffolding tactics that enhance both intrinsic and extrinsic motivation.

Writing, which was once considered the major expertise of the privileged and well-educated individuals, has become an essential skill for people at all levels of education in today's global community. Writing is usually used in many communicative activities, such as composing academic essays, business reports, letters, reporting analyses of current events for newspapers or/and web pages, e-mails, or/and short off-line messages in widely used messenger programs. Therefore, the ability to write expressively and effectively allows individuals from different cultures and backgrounds to communicate their thoughts and their needs. Furthermore, it is now widely recognized that writing plays a very important role not only in conveying information, but also in transforming knowledge to create new knowledge. Learning to write has, consequently, turned out to be a very important skill for university students in the first language, as well as the second or foreign language programs, throughout the world.

Metacognition plays a role in every stage of the writing process, from the analysis of the task and the rhetorical problem to the linguistic choices involved in the process of putting thoughts into words, to the self-monitoring and revising processes that occur during and after the act of writing. Negretti (2021) highlights how metacognitive awareness of rhetorical and genre-relevant aspects such as appropriateness of topic, the purpose of the text, audience expectations, and effectiveness of argumentation imbues every moment of the writing experience and helps novice students develop a personal, agentive approach to writing academic papers.

2. Review of the Literature

Scholars do not agree with the definition and scale of scaffolding, but there is an increasing curiosity in the usage of scaffolding in their research, hence this concept is sometimes used loosely (Hammond & Gibbons, 2001). Studies on the impact of scaffolding have yielded varying findings, but the majority have suggested that scaffolding is successful in improving student learning. Most experiments comparing the use and non-use of scaffolding in language teaching have found that scaffolding can help learners with different learning purposes (Chang, et al., 2001; Ge & Land, 2003; King, 1991; Salmon, Globerson & Guterman, 1989).

Scaffolded teaching is based on the concept of the ZPD of Lev Vygotsky (1978). Vygotsky (1978) states that there are two parts of the developmental stage of the learner: the "actual level of development" and the "potential level of development." The Zone of Proximal Development (ZPD) is the "distance between the actual level of development as determined by independent problem-solving and the level of potential

development as determined by problem-solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). ZPD can also be defined as the region between what a learner can do on his own and what can be done with the aid of a more experienced parent or peer.

Vygotsky claimed that 'good learning' was going to happen in the child's ZPD. The commitment of the learner's ability to control his/her learning and to encourage the learner to do as well as possible without any help is an essential element in teaching in the ZPD. 'Fading' is a term used in the ZPD that refers to the incremental disappearance of the scaffolding provided to the learner until it is completely gone. Finally, the learner internalizes the new knowledge and becomes a self-regulating and autonomous learner.

It is crucial that the innovation of the ZPD is at a preliminary stage (Holzman, 2010). Specifically, this kind of imagination is not an individual trait, but a social characteristic, which is not that remarkable but normal (Holzman, 2010). Therefore, Holzman (2010) talks about ZPDs that are socially built relative to ZPDs that are generated inside the mind of the person. Ellis (2004) cites ZPD as a central framework in socio-cultural theory from which many key principles of learning are exposed. Second, it addresses why certain learners are ineffective in handling such systems after being subjected to external mediation; in other words, they are unable to establish the relevant ZPD to execute the structures. Second, it explores the reason why social assistance allows learners to excel in performing those systems, but cannot be achieved individually. Finally, with the guidance of additional mediation learners, new mechanisms may be internalized to build the requisite ZPD.

According to Pearson (1996), the usefulness of scaffolding arises as the teacher holds the entire job, while the students learn to understand and handle the pieces, and challenges the learner with just the right challenge. In addition, successful L2 learning requires a set of activities and materials that L2 teachers should try to imbue their classes. The role of technology in L2 learners' life is unquestionable; in fact, it was believed that technology is like an earthquake which stimulates L2 learners to reshape their language learning on a new basis.

The process writing, from Marzban and Nouri (2020, p. 32) occurs "as a result of the interaction between the students and the teacher in the form of dialogic interaction. One theory that takes into account the interaction as a whole is called Activity theory. Activity theory is based upon the work of Vygotsky and his student Leontiev from their studies of cultural- historical psychology in the 1920s".

Using language-learning technology (LLT) showed to be beneficial in many aspects. There are diverse instruments-related to technology, for example, CDs, DVDs, headphones, data projectors as well as the internet which can be approached for some typical activities as computer-based exercises, internet surfing, websites, online dictionaries, translator dictionaries, or e-mails, chatrooms for communication with native or non-native speakers of English language around the world. These achievements brought by technology have their benefits that are illustrated as follows:

The first and significant benefit that technology has been presented is flexibility.

It means that students have access to the materials not only in their schools or universities but also any time at home (Murday, *et al.*, 2008). Accordingly, teachers, and students "(are getting more) active members of a community that thrives far beyond the spatial and temporal limitations of the traditional classroom (Lee, 2005, p. 152)". Moreover, it seems that students prefer to learn based on their own pace of learning as well as to choose their specific materials based on their academic progress (Murday *et al.*, 2008).

Technology-based scaffolding practices are planned and carried out as part of this study. Technology-based scaffolding involves all presentations of various language elements, such as vocabulary, voice, writing, and open-ended, multi-choice, short response, and yes/no question exercises by computer-based applications to evaluate their success through the use of scaffolding.

Li (2017) used online writing instruction focused on instructional scaffolding and examined the usage of various scaffoldings in writing instruction to strengthen the writing ability of EFL learners. The scaffolding training was proposed to be applied in five stages, consisting of constructing class scaffolding, developing real-world environments, individual discovery, collective learning, summarization, and evaluation.

Santoso (2010) examined the impact of scaffolding on foreign language learners' writing in a hybrid-learning situation (consisting of both online and face-to-face contact). In the classroom, new scaffolding techniques were developed and used. By the conclusion of the study, students had learnt to rely on scaffolds and to be self-sufficient. The findings revealed that pupils' effective writing abilities had improved.

Motivational-based scaffolding uses a variety of techniques to inspire and empower learners. These techniques are used along with teacher's supportive assistance, such as novels, role-plays, and ZPD-based games. In this respect, Cheung (2018), in a qualitative study, investigated the effect of instructors' use of motivational strategies on students' motivation in writing. Data were collected from 344 first-year undergraduate students through classroom observation and surveys. The results revealed that the writing instructors' use of strategies in generating students' initial motivation in the classroom radically enhanced students' positive attitude self-confidence in the writing course.

Hasan (2018) investigated the impact of scaffolding on the development of higher order thinking capabilities in students at tertiary levels in the university education system. He focused on both motivating and demotivational variables in scaffolding. The development of the learner's proximal index in accordance with Vygotsky's principles was also studied during this study to determine whether learners in the process of writing are following the teacher's implicit instructions and teachers are dealing appropriately with the deployment of scaffolding technology. The findings revealed that both teachers and students followed similar patterns in comprehending the scaffolding strategy in the acquisition of writing abilities. He discovered that the employment of efficient motivational scaffolding approaches is the most appropriate in contemporary L2 scenarios for addressing the challenges of

students' poor and insufficient written communication abilities.

The framework of processes described under metacognitive-based scaffolding can help us understand how awareness of genre, discourse, and rhetoric comes into play when students read and write texts that are situated in different contexts. Therefore, using scaffolding activities through metacognitive framework provides a specific, applicable model for research purposes, and can help identify how and when awareness of genre permeates learners' understanding of academic texts and their own writing choices. Metacognitive scaffolding includes the use of such metacognitive techniques, such as tracking, assessing, and providing input for behaviors that allocate learning assignments and activities between the present stage and the developmental level of the ZPD learners.

In this regard, Mortazavi, *et al.*, (2016) investigated the effects of structuring and problematizing scaffolding mechanisms, as well as the possible moderating effect of proficiency level, on writing self-regulatory skills, essay writing ability, and global planning time. In their study, 120 pre-intermediate and 120 advanced Iranian English learners participated. The researchers examined the amount of time participants spent arranging the content and arrangement of the writing examination in the two sessions. The findings demonstrated that scaffolding mechanisms improved self-regulation and writing abilities significantly. Furthermore, scaffolding mechanisms improved the amount of time participants spent on global planning. According to the findings, scaffolding mechanisms work best when supplied concurrently.

Valencia-Vallejo, *et al.*, (2019) studied the effects of a metacognitive scaffolding on metacognition, academic self-efficacy, and learning achievement in students with different cognitive styles in the Field Dependence-Independence (FDI) dimension when learning math content in an e-learning environment. Sixty-seven students of higher education from a public university of Bogotá, Colombia participated in the study. One group of students interacted with an e-learning environment, which includes within its structure a metacognitive scaffolding. The other group interacted with an environment without scaffolding. The results showed that scaffolding promotes significant differences in metacognitive ability, academic self-efficacy, and learning achievement. Similarly, the data show that students with different cognitive styles achieve equivalent learning outcomes.

According to Belland et al. (2013), although all types of scaffolding are aimed at making learning activities more controlled which in turn improves success expectations and contributes to motivation. Scaffolding exercises are specially developed to assist learners in maintaining motivation and interest.

So far, much empirical research has addressed the application of scaffolding in the acquisition of writing skills; however, none of these studies have investigated the motivational element of scaffolding and its influence on the acquisition of writing abilities.

Classrooms with traditional teaching methods lack engaging strategies and learner engagement and therefore negatively affect learners' performance. In such settings, the learners are not familiar with their daily tasks

since it is not a learner-centered. There needs to be more research on using teaching techniques that increase learner engagement. EFL learners, like those that participated in the present study, may need different types of support to develop their language skills just like the learners who learn a language in a supportive setting through engagement and practice. This support could be achieved by scaffolding the learning context.

The present study can contribute to solving the problems of EFL teachers in decreasing the amount of instructional input to learners in class time. This study introduces instructional scaffolds in supporting language learners when they are working on specific tasks such as English activities or oral discussions. Using scaffolding will help EFL learners to achieve target language structures, and in this case to develop their writing in English classes. The present study aimed to find how technology instruments, motivational and metacognitive strategies affect Iranian EFL learners' writing when they are used in scaffolded instruction.

The success of the learners is investigated in order to guide their learning processes. The learners will be in charge of their learning. The following research questions were posed to address the purpose of the study:

1. To what extent does technology-based scaffolding have any significant impact on Iranian EFL learners' writing skills?

2. To what extent does metacognitive-based scaffolding have any significant impact on Iranian EFL learners' writing skills?

3. To what extent does motivational-based scaffolding have any significant impact on Iranian EFL learners' writing skills?

4. Which type of scaffolding has a more significant impact on improving Iranian EFL learners' writing ability?

Methods

Participants

The participants of this study were 60 female Iranian EFL learner who were selected based on their performance on the Preliminary English Test (PET). The level of language proficiency of the learners was intermediate. They were then randomly divided into three equal groups, each consisting of 20 members. The groups included technology-based, motivational-based, and metacognitive scaffolding. The participants' native language was Persian. Their age range was between 18 and 32. The researcher and the professional EFL trainer scored the scores of the participants.

Instruments

The instruments of this study are explained as follow:

The PET was used to homogenize the subjects concerning their language abilities. The test edition used in this analysis applies to 2004. PET is a common measure of language proficiency at the intermediate level; thus the reliability and validity of the test are obvious. PET is comprised of four main sections of reading, listening, writing, and speaking.

The reading section of the PET was used to determine the students' level of reading comprehension. It is composed of 35 items with five different reading assignments in all of Sections 1–5. The listening section was made up of four sections. Part 1 included 7 questions, each of which had three photos and a short recording. Students had to pick the right photo and place a tick in the box

below. Part 2 consisted of six multiple-choice questions that were drawn from an audio segment. Part 3 contained 6 fill-in-the-blank objects. Participants listened to the audio file and fill in the missing details. There were 6 questions in part 4 where students heard dialogue and determined whether each sentence was right or wrong. The writing portion of the PET consists of three sections. Section one consisted of five pieces about a canal boat vacation. Each query had two sentences for the participants to complete the second sentence in such a way that it was the same as the first. It was holding five points. The second section consisted of an object that requested students to send an e-mail to a friend about moving to a new apartment. The number of words to be used in writing ranged between 35 and 45 words. It also had five marks. Part 3 had two questions that the learners were obliged to answer. Students have been asked to write a 100-word story about the most important day of my life. It has been allocated 15 points. The writing segment of the PET had a total of 25 points. The speech portion of the Preliminary English Test (PET) analysis comprised four sections. Each of the candidates communicated with the interlocutor. The interlocutor, in turn, asked the candidates questions using standardized questions. The queries involved the provision of accurate and personal knowledge. Applicants refer to inquiries about current situations, personal encounters, and future expectations.

The pretest and posttest include the writing section of The International English Language Testing System (IELTS). The writing section consists of two tasks, which required learners to write at least 150 words for Task 1 and at least 250 words for Task 2. In Task 1, a situation was presented for the participants and they were asked to write a letter requesting information or explaining the situation. The letter could be personal or semi-formal in style. In Task 2, they were asked to write an essay in response to a point of view, argument, or problem. The assessment was based on task achievement/response, coherence, and cohesion, lexical resource, grammatical range, and accuracy.

An interview was conducted in order to seek out the participants' motivation. This interview made the qualitative part of the study. The kind of interview conducted in this study was a semi-structured one. In this type of interview, the whole process of interviewing changes throughout the continuum of highly-structured to highly unstructured in that the predetermined questions were not necessarily asked in a fixed order but rather in a more flexible manner. This interview consists of five questions.

Procedure

The design of this study is a mixed-methods one, sequential explanatory in particular. The exploratory sequential mixed methods design was characterized by an initial quantitative phase of data collection and analysis, followed by a phase of qualitative data collection and analysis. The research project was conducted by administering the pre-test to assess the ability of the participants to write. In a technology-based scaffolding group, the researcher attempted to explain the aims of each unit for about five minutes before beginning it. The students were told what they were going to learn at each session. After clarifying the aims, the researcher set up a multimodal

presentation of the curriculum to cover the vocabulary portion. For example, introducing a new vocabulary by spelling and grammar, examples, graphics (pictures, sketches, videos), meaning (story, action), and so on.

Participants were presented with a handout containing the ID and password needed to access the method, writing themes, the time and date for submission of each piece of writing, and various means of contact that students could use to inquire about potential technical issues during the study period. Five subjects for writing have been arranged in such a manner as to cover various fields of concern. The subjects ranged from space travel and technological discovery to medical science and social concerns. Participants were told that they could explore everything relevant to the writing process in the forum.

Participants were required to write a minimum of 300 words each week on a specific topic. They were told that they would be able to write it from any device at any time that would give students enough time to complete their compositions, free of class-based constraints. When learners submitted written work, the researcher corrected the writings in terms of both content and meaning and annotated comments back into the text, and encouraged learners to re-submit their revised texts. The learners were able to see all their earlier work with annotated comments to allow them to be guided in a progressive process of writing development. The researcher corrected learners' submitted writings in the evaluation part. Their mistakes and errors in terms of development, organization, grammar, and vocabulary were determined. All the participants received individualized feedback. Learners were asked to go through the corrected writings and submit them in the revising section.

In the motivational scaffolding group, writing instruction was focused on exercises that increased the enthusiasm of the learners. For the writing of the instruction, the activities allocated to the class were primarily focused on the interest of the learners. The topic of the task provided to participants was chosen in an engaging and pleasant manner. It includes a wide range of perspectives, including personality, relationships, daily life, eating habits, physical appearance, and professional life. It was accomplished in order to guarantee that both students could approach them using their present vocabulary skills and that they were at or around their current level of proficiency. Furthermore, the learners' success in the activities was assured since they had the capability to carry out the activity without using their native language. The teacher reflected on the participants' at-home-prepared writing samples, and the gaps (lexical, functional, and organizational) were critically highlighted in such a way that the correct modeling of each mistake was presented to the participants regarding the situational use of the concepts they used in their writing samples.

Finally, in the last session, the learners were asked to take on the imaginative role of each generic subject and to write argumentatively about it. For example, the participants were asked to write argumentatively on the subject: imagine you are walking outside. The spring storm is coming, what do you see, hear, smell, taste, and touch? The participants' writing samples were then marked by the teacher and decided

individually on the kinds of mistakes they had made.

In the metacognitive scaffolding group, guidance on writing, 20 minutes of each session are devoted to the explanation of writing methods, such as problem-solving tasks, challenging, teaching critical reasoning, analyzing the statements of others about their writing. The fundamentals of essay writing were then taught, and the participants were given a subject for writing. Any student could share his/her views on the proposed topics and experience of critical teaching. In order to take supervision into account, the instructor also acted as facilitator, reviewed the groups one by one, and offered feedback where appropriate. The participants listened and if possible, made changes. They were also asked to take care of the most relevant issues addressed in the community and to write a paper on the day's events for the instructor. The instructor had the position of timekeeper and was in charge of all that had occurred in the events of the group. The assessment stage was the most important aspect that pushed the participants to read objectively while they extracted the key concept and wrote the most important message in their texts. Then the learners were asked to clarify the author's point of view and to offer their writing essays.

Finally, participants from all groups were asked to take the research post-test. Their success in the post-test was compared to figure out their distinction. At the end of the study, all participants took part in the interview.

Results

Descriptive statistics of the participants' scores on the pretest are shown in Table 1.

Table 1. *The descriptive statistics of the participants' scores on the pretest*

		N	Minimum	Maximum	Mean	Std. deviation
Pretest Writing (technology-based)	Rater 1	20	1	5	3.20	.51
	Rater 2	20	1	5	3.05	.83
Pretest Writing (metacognitive-based)	Rater 1	20	1	4	3.10	.87
	Rater 2	20	1	5	3.20	.86
Pretest Writing (motivational-based)	Rater 1	20	1	5	3.10	.64
	Rater 2	20	1	4	3.20	.78

In order to calculate the inter-rater reliability of the pre-test scores obtained by two raters in both classes, a sequence of Pearson-product moment correlation coefficients has been developed. The findings can be seen in Table 2.

Table 2. *The inter-rater reliability of the pretest writing scores for all groups*

	Pearson Correlation	Sig. (2-tailed)	
Pretest Writing (technology-based)	.996**	.000	
Pretest Writing (metacognitive-based)	.965**	.000	
Pretest Writing (motivational-based)	.981**	.000	
**Correlation is significant at the 0.01 level (2-tailed).			

The results demonstrated that there was a significant relationship between the pretest scores obtained by two raters in all groups and tests. Thus, the inter-rater reliability of the writing scores on the pretest was highly significant.

To ensure that there is no significant difference between the groups regarding their language skills at the beginning of the study, a one-way ANOVA was performed. The results are provided in Table 3.

Table 3. *The one-way ANOVA results of the pretest*

ANOVA					
Pretest					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.242	2	.248	.181	.969
Within Groups	156.750	58	1.375		
Total	157.992	60			

The results showed that there was not any significant difference among the three groups regarding their performance on the writing pretest (F = .181, p <.001). The descriptive statistics of the participants' performance on the posttest are shown in Table 4.

Table 4. *The descriptive statistics of the participants on the posttest*

		N	Minimum	Maximum	Mean	Std. deviation
Posttest Writing (technology-based)	Rater 1	20	3.00	7.00	4.45	1.51
	Rater 2	20	3.00	7.00	4.55	1.53
Posttest Writing (metacognitive-based)	Rater 1	20	3.00	7.00	4.70	1.37
	Rater 2	20	3.00	7.00	4.55	1.26

Posttest Writing (motivational-based)	Rater 1	20	3.00	8.00	5.00	1.64
	Rater 2	20	3.00	8.00	5.20	1.78

The inter-rater reliability of writing scores on the posttest for all groups was calculated using the Pearson correlation. The results of the statistical analyses are provided in Table 5.

Table 5. *The inter-rater reliability of the posttest writing scores for all groups*

	Pearson Correlation	Sig. (2-tailed)	
Posttest Writing (technology-based)	.983**	.000	
Posttest Writing (metacognitive-based)	.974**	.000	
Posttest Writing (motivational-based)	.988**	.000	
**. Correlation is significant at the 0.01 level (2-tailed).			

The results demonstrated that there was a significant relationship between the posttest scores obtained by two raters in all groups. Thus, the inter-rater reliability of writing scores on the posttest for all groups was highly significant.

To verify the first research question of the study in finding the extent to which technology-based scaffolding affects Iranian EFL learners' writing ability, a paired sample t-test was conducted between the pretest and posttest writing scores of the learners. The results are shown in Table 6.

Table 6. *The paired sample t-test between the writing scores in the technology-based 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	Posttest Writing (Technology-based) - Pretest	1.450	.51042	.11141	1.21112	1.68888	12.704	19	.000

The difference between learners' pretest and posttest writing scores was significant, (t = 12.70, p < .001). The results showed that there was a statistically significant difference in the pretest and posttest writing scores of the participants in the technology-based

scaffolding group in such a way that the writing ability of the learners was enhanced through the use of technology-based scaffolding in the classroom. Therefore, the use of technology-based scaffolding was effective in developing EFL learners' writing ability, and the first research question of the study was verified.

To verify the fourth research question of the study in finding the extent to which metacognitive-based scaffolding affects Iranian EFL learners' writing ability, a paired sample t-test was conducted between the pretest and posttest writing scores of the learners. The results are shown in Table 7.

Table 7. *The paired sample t-test between the writing scores in the metacognitive-based 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	Posttest Writing (Technology-based) - Pretest	1.450	.51042	.11411	1.21112	1.68888	12.704	19	.000

The results demonstrated that the difference between the learners' pretest and posttest writing scores was significant, (t = 12.70, p <.001). The results showed that there was a statistically significant difference in the pretest and posttest writing scores of the participants in the metacognitive-based scaffolding group in such a way that the writing ability of the learners was enhanced through the use of metacognitive-based scaffolding in the classroom. Therefore, the use of metacognitive-based scaffolding was effective in developing EFL learners' writing ability, and the fourth research question of the study was verified.

To verify the third research question of the study in finding the extent to which motivational-based scaffolding affects Iranian EFL learners' writing ability, a paired sample t-test was conducted between the pretest and posttest writing scores of learners. The results are shown in Table 8.

Table 8. *The paired sample t-test between the writing scores in the motivational-based group*

Paired Samples Test							
	Paired Differences				t	df	Sig. (2-
	Mean			95% Confidence			

			Std. Deviation	Std. Error Mean	Interval of the Difference				tailed)
					Lower	Upper			
Pair 1	Posttest Writing (Motivational-based) - Pretest	2.900	1.20961	.2704	2.3338	3.46612	10.722	19	.000

The results revealed that the difference between the learners' pretest and posttest writing scores was significant, (t = 10.72, p <.001). The results showed that there was a statistically significant difference in the pretest and posttest writing scores of the participants in the motivational-based scaffolding group in such a way that the writing ability of the learners was enhanced through the use of motivational-based scaffolding in the classroom. Therefore, the use of motivational-based scaffolding was effective in developing EFL learners' writing ability, and the third research question of the study was verified.

To verify the fourth research question of the study in finding which type of scaffolding has a more significant effect on improving Iranian EFL learners' writing ability, a two-way ANOVA was conducted to compare the pretest and posttest writing scores of the learners in three study groups. The independent variables of the study were the technology-based, metacognitive-based, and motivational-based scaffolding groups. The dependent variables were the pretest and posttest writing scores. The major assumptions for a two-way ANOVA between groups needed to be checked, including the level of measurement, random sampling, independence of observations, normal distribution, and homogeneity of variance. For the assumption of the normality of the scores, one sample Kolmogorov-Smirnov test was performed. The results are shown in Table 9.

Table 9. *Kolmogorov-Smirnov test for pretest and posttest scores in all groups*

		Posttest Writing (technology-based)	Posttest Writing (metacognitive-based)	Posttest Writing (motivational-based)
N		20	20	20
Normal Parameters[a,,b]	Mean	4.50	4.62	5.10
	Std. Deviation	1.52	1.31	1.71
Most Extreme Differences	Absolute	.182	.141	.192
	Positive	.182	.095	.192
	Negative	-.159	-.141	-.121

Kolmogorov-Smirnov Z	.751	.580	.793
Asymp. Sig. (2-tailed)	.625	.890	.555

As it is indicated in Table 10, p-value for each set of scores is higher than 0.05, therefore all sets of scores have normal distributions. Therefore, the assumption of normality was satisfied. In order to investigate the assumption of homogeneity of variance, Levene's test of equality of error variances was conducted. Table 10 shows the results of this test.

Table 10 *Levene's test of equality of error variances*

F	df1	df2	Sig.
1.580	1	32	.218
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
a. Design: Intercept + Pretest + Groups			

The results of Levene's test of equality of error variances demonstrated that none of the variables reached a statistical significance; that is, there were no values less than .05. Therefore, the assumption of homogeneity of variance is satisfied. To examine the possible interaction effect of different scaffolding groups on the writing skill pretest and posttest, tests of between-subjects effects were inspected. The results are shown in Table 10.

Table 10. *Two-way ANOVA to compare the pretest and posttest writing scores of all groups*

Tests of Between-Subjects Effects					
Dependent Variable: Writing Test					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	141.475[a]	5	28.295	15.594	.000
Intercept	1992.675	1	1992.675	1098.211	.000
Grp	13.850	2	6.925	3.817	.025
Tests	114.075	1	114.075	62.869	.000
grp * Tests	13.550	2	6.775	3.734	.027
Error	206.850	114	1.814		
Total	2341.000	120			
Corrected Total	348.325	119			
a. R Squared = .406 (Adjusted R Squared = .380)					

As seen in Table 10, the interaction effect between the learners' pretest and posttest writing scores was significant (F = 3.73, p <.001). The results showed that there was an overall statistically significant difference in the pretest and posttest writing scores of technology-based, metacognitive-based, and motivational-based scaffolding groups. Therefore, the use of different types of scaffolding was effective in developing EFL learners' writing ability. To detect the source of the differences, the LSD post-hoc multiple range test was performed. The results are shown in Table 11.

Table 11. *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
Technology-based Scaffolding	Metacognitive-based Scaffolding	-.1250	.30120	.679	-.7217	.4717
	Motivational-based Scaffolding	-.7750*	.30120	.011	-1.3717	-.1783
Metacognitive-based Scaffolding	Technology-based Scaffolding	.1250	.30120	.679	-.4717	.7217
	Motivational-based Scaffolding	-.6500*	.30120	.033	-1.2467	-.0533
Motivational-based Scaffolding	Technology-based Scaffolding	.7750*	.30120	.011	.1783	1.3717
	Metacognitive-based Scaffolding	.6500*	.30120	.033	.0533	1.2467
Based on observed means. The error term is Mean Square (Error) = 1.814.						
*. The mean difference is significant at the 0.05 level.						

As Table 11 exhibits, post-hoc comparisons using the LSD test indicated that the mean score for writing in the motivational-based group was significantly different from the technology-based and metacognitive-based groups. However, the

performance of the technology-based scaffolding group in writing tests was not significantly different from the metacognitive-based scaffolding group.

The qualitative analysis includes the analysis of the participants' responses to a semi-structured interview. The learners were interviewed on their motivation in learning the contents of the instruction they had received. The students were asked whether they understood the most difficult material presented in this course. Forty-three (72%) interviewees responded that it was true for them, 12 (20%) responded negatively, and 5 (8%) had no idea. The second question was about whether they were interested in the course contents. Most of the participants (n = 54) responded positively to this question. The third question asked them what kind of materials arouses their motivation in this course. The answers were so different. They said that the kind of materials which have fun, provide them feeling happy, stimulating their curiosity, challenging, complex, yielding good grades, easily understood, helping them to organize their thoughts, the most necessary for their life, developing their ideas, achieving success, and improving their memory. The fourth question asked the interviewees what kind of feeling they had during taking the tests. Twenty-six (43%) students stated that they felt confident, 14 (23%) students felt neutral, and 20 (33%) students felt uneasy during taking tests. Finally, the fifth question asked the participants if the course contents were useful for them. Forty-eight (80%) students said that the course contents were useful for them and 12 (20%) disagreed with this view.

Discussion

The present research explored the impact of motivational, metacognitive, and computational scaffolding on the writing abilities of EFL learners. The findings of the three paired sample t-tests showed that there was a statistically significant difference in the pre-test and post-test scores of all classes in such a way that learners' writing abilities were improved by the use of technological, metacognitive, and motivational scaffolding in the classroom. The findings showed that the motivational scaffolding strategy outperformed the other two classes in improving the writing skills of the EFL learners.

What is worth noticing is what was happening in the motivational-based scaffolding instruction. The learners faced new scaffolding actions (i.e., giving a direction, providing enlightenment, sharing an experience, and offering a solution) emerged in their classroom interactions. It is evident that learning is a creative process and that once they have mastered the skills, the learners may be able to expand themselves to other similar situations, where they can apply what they have learned before. The encounters with the previous scaffolding processes may have helped them provide scaffolding to scaffold their friends in various similar or completely new situations.

The effectiveness of motivational form of scaffolding is the distinguishing element of the outcomes of this study. This conclusion may be understood from the sociocultural perspective as motivation may bridge the gap between the learners' skills and those of a more knowing person; consequently, the social contacts through writing activities might assist learners acquire higher

psychological functions within ZPD. The students might collaborate with their peers and teacher to build their knowledge. The students mentally replicated the teacher's mental processes by comprehending and using the criticism they got from teachers in their speech. Language learning will be simpler when English language education is decoded utilizing scaffolding exercises. Scaffolding was beneficial to learners' writing ability because it enhanced the learning process by giving students with lots of support in genuine circumstances, linking their prior knowledge with the texts, and promoting interaction among learners.

The results of this study corroborated with those of Santoso (2010) who found that foreign language learners' writing in a hybrid-learning situation (consisting of both online and face-to-face contact) had improved. Scaffolding created an environment in which students could actively participate in writing exercises. These findings are consistent with Valencia-Vallejo, et al, (2019) who showed that scaffolding promotes significant differences in metacognitive ability, academic self-efficacy, and learning achievement.

In a qualitative analysis, Cheung (2018) explored the influence of instructors' use of motivational techniques on student motivation in writing. Data were obtained from 344 first-year undergraduate students by classroom observation and surveys. The findings found that writing teachers' use of techniques to produce students' initial inspiration in the classroom has dramatically improved students' optimistic approach to self-confidence in writing.

The success of technology-based scaffolding is also dependent upon the structure and organization that it provides for language learning materials and, as a result, it makes easy the process of language learning. Technology-based scaffolding assisted learners to increase their attention, reduce anxiety, receive immediate feedback and increase their motivation. This finding is approved by Hasan (2018) who found that employment of efficient motivational scaffolding approaches is the most appropriate in contemporary L2 scenarios for addressing the challenges of students' poor and insufficient written communication abilities. The results also confirmed those of Mortazavi, *et al.*, (2016) who demonstrated that scaffolding mechanisms improved self-regulation and writing abilities significantly.

Conclusion

The current study can give teachers with information on both the learners' actual level of performance and their learning potential. They can create individualized learning strategies for students with varying learning requirements. To put it another way, two pupils with the same non-dynamic but differing high and low learning potential ratings might be addressed differently. Learners with limited learning potential should be given learning and information processing tactics such as scaffolding exercises; similarly, the instructor should design various plans for each individual learner. The current study proved that systematically scaffolded training boosted EFL learners' language achievement. A sufficient quantity of scaffolded instruction assisted EFL learners in doing their best and bridging gaps in their zone of proximal development.

The findings of the present study can be beneficial for language teachers to eliminate

or minimize the counterproductive effects of conventional techniques and strategies on EFL learners' behavior as well as their learning. Scaffolding techniques help EFL learners enhance their learning speed, authenticity, and performance.

The major limitation of the study was that the subjects in the study were not selected randomly. A convenience sample was used. The small size of the sample groups shed doubt on the universal validity of the observed significance. A study with more participants must be replicated to gain more reliable and generalizable outcomes. This study was conducted with two groups. To exclude the age factors, the researcher tried to study students of approximately the same age.

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