



# The effect of web-mediated, blended, and purely online learning on EFL learners' writing achievement in the Iranian context: A comparative study

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## Abstract

In the era of web-based technology, the conventional instructions seem archaic and need to be replaced or improved with more novel technology-enhanced instructions (TEIs) that have been reported to enrich the instructional settings by providing further innovative teaching and learning opportunities. As a result, the present study aimed at not only examining but also comparing the effectiveness of web-mediated, blended, and purely online learning instructions on EFL learners' writing achievement in the Iranian context. Therefore, 49 homogenous participants were randomly assigned into the web-mediated leaning (WML) group that attended the workshop physically at predetermined times, the enriched virtual blended learning (EVBL) group that not only was provided with online sessions but also received compulsory in-person instructional sessions, and the purely online leaning (POL) group that merely received an online instruction. All learners delivered four argumentative essay writing pre-tests, performed the WebQuest tasks, engaged in pair/group works, completed all the sub-tasks, and finally wrote four essays as post-tests. The results of paired-samples *t*-tests revealed that EFL learners' achievement in writing skill as a whole and writing sub-skills improved significantly from pre-tests to post-tests in all the WML, EVBL, and POL groups. The mentioned finding was vindicated considering the peculiar characteristic of EFL learners and the distinctive nature of TEIs. In addition, the results of one-way between-groups ANOVA indicated that WML and EVBL groups outperformed the POL group in the overall writing achievement, which was explained in the light of technology-related dimension, the interaction dimension, and the conventional perspective of education dimension. The presented findings can provide insights for stakeholders to incorporate more TEIs in developing EFL contexts.

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**Keywords** Blended learning · Online learning · Web-mediated learning · Writing skill

## 1 Introduction

Writing has been defined as a skill involving cognition, which requires a great deal of thinking and reflection on a specific topic and demands the writer to not only analyze and synthesize the background knowledge but also have a good command of the target language to ultimately present a cohesive and coherent piece of written discourse (Chakraverty & Gautum, 2000). The power of writing in the clear expression of feelings and thoughts, clarification of knowledge and conceptions, and comprehension of faced problems in addition to its uses as a means to achieve self-actualization by putting the thoughts and ideas on paper highlights the significance of this skill in language teaching and learning (Hidayati, 2018). Similarly, according to Coffin et al. (2003), being successful in academic assessments, improving critical thinking skills, broadening the learning and understanding beyond the classroom environment, enhancing the communicative skills, and being prepared for future professionals are some reasons for learners to improve their writing skill.

Although writing as a must-required language skill is one of the acknowledged objectives of learning foreign languages (Vakili & Ebadi, 2019), this skill has been considered as the most challenging language skill to be learned by EFL learners (Du, 2020; Jabali, 2018). This point can be justified by attending to the nature of writing as a complicated cognitive skill that entails simultaneous integration of various aspects of the target language including the grammar, spelling, punctuation rules, etc. in the process of writing (Dar & Khan, 2015). Review of literature represents lower vocabulary knowledge (Misbah et al., 2017), grammar deficiencies as well as poor punctuation and spelling categorized as conventions sub-skill (Younes & Albalawi, 2015), lack of focus on the main topic (Muamaroh et al., 2020), illogical flow of ideas due to the lack of organization sub-skill (Ashraf et al., 2020), and insufficient elaboration sub-skill to provide appropriate ideas or details to support the main topic (Ariyanti & Fitriana, 2017) as a number of learners' main challenges in presenting high-quality written products.

To appropriately respond to EFL learners' challenges in writing well-developed essays, a number of researchers including Anh (2019), Zandi and Krish (2017), and Aydin and Yildiz (2014) put trust in the integration of innovative and promising technology-enhanced instructions (TEIs) in teaching writing skill. Technological innovations are now changing the very way the instruction is provided in the higher education. Over the last decades, the implementation and integration of TEIs in higher education have been promoted to set the scene for transforming and improving teaching and learning practices (Conole, 2014). It seems that the presentation of new instructional practices via educational technologies can increase learners' acquaintance with the idioms, vocabulary, sentence structure, and flow and relatedness of ideas in a written text and improve

learners' writing main skill and sub-skills. The mentioned improvements can be accelerated by engaging learners in more interesting writing opportunities, enhancing and activating their prior knowledge, and exposing them to more authentic materials and multimodal discourses enjoying graphs, web sites, texts, videos, pictures, etc. Therefore, it seems that the application of novel TEIs including but not limited to web-mediated, blended, and purely online learning instructions can leverage or supplement conventional instructions to improve EFL learners' writing skill.

The first TEI focused on in the present study is the web-mediated learning instruction that refers to the utilization of World Wide Web to enhance traditional classrooms with an access to online instructional activities and electronic resources. However, it should be taken into account that the amount of each class session does not reduce in this instruction. The second novel TEI addressed in this study is blended learning, which has been characterized by merging the conventional face-to-face instruction with computer-assisted language learning instruction (Kvashnina & Mrtynko, 2016) and has been considered as an accessible, meaningful, and flexible way of instruction (Senffner & Kepler, 2015). Among various blended learning models that have been proposed, a prominent categorization has been presented by Staker and Horn (2012) as follows: 1) The rotation model, in which learners are supposed to rotate through stations and learning modalities. 2) The self-blend model, in which one or more online courses are provided to complement the conventional courses. 3) The flex model, which considers online learning accompanied with teachers' in-person on-site support as the backbone of instruction. 4) The enriched virtual model, which is primarily online but is supplemented with an obligatory in-person attendance in instructional sessions. Finally, purely online learning is the third new TEI examined in this study. Simultaneous to a zealous in the application of new educational models including web-mediated and blending learning instructions, COVID-19 pandemic in 2020 has made remarkable changes in various fields of human life including working, praying, and studying (Basilaia & Kvavadze, 2020) and has highlighted the inevitability of online learning due to class suspensions (Moorhouse, 2020). Purely online learning as the most recent trend in TEI merely depends on the Web and Internet to mediate the instructional context.

Although a number of preceding studies including Rahayu (2021), Shooli et al. (2021), Mahmoudi (2020), Hosseinpour et al., (2019), Ebadi and Rahimi (2018), Asgari and Salehi (2018), and Permana (2017) have documented about the application of each of the web-mediated, blended, and online learning instructions in various contexts, few studies, to the best of the current researchers' knowledge, have been devoted to comparatively examine the effect of the mentioned instructions on EFL learners' writing achievement. Kawinkoonlasate (2019), for instance, conducted a comparative quasi-experimental study on traditional and E-writing approaches to examine 60 EFL learners' writing ability. The findings revealed the outperformance of learners' receiving E-writing instruction. In the same vein, comparing online and conventional writing, Norouzifard and Sadighi (2017) reported the positive effect of online writing on EFL university students' organization, conventions, and word choice writing sub-skills. In another study with a focus on the Iranian context, Alipour (2020) compared the effectiveness of online, blended, and traditional

learning on EFL learners' vocabulary development. The findings indicated the significant vocabulary improvement of both online and blended groups as compared with the control group.

In spite of the nearly alluring appeal of TEIs, higher education has been faced with serious challenges in terms of being up-to-date in the technology implementation within the educational setting. Academic planners have to take part in a continuous catch-up game to propose the most appropriate type of TEI considering the peculiar features of the target teaching and learning context. According to Zhang and Zhu (2018), specifying the best instructional approach for almost all learners is a demanding task. In addition, learners' performance, learning process, motivation, and attitude towards novel instructional approaches may be negatively affected by haphazard selection and integration of TEIs into educational settings. Consequently, more studies and plenty of analyses and planning are welcome in this respect prior to the actual implementation of TEIs. Although some studies have been published addressing each of the web-mediated, blended, and purely online learning instructions in EFL classes, there are only a limited number of studies and indeed none, as far as the presented literature review revealed, comparing all the mentioned instructions with one another. Additionally, given the astonishing interest in employing TEIs across various skills and EFL contexts, this study made an attempt to examine a less-touched focus skill, i.e., writing skill as well as its sub-skills of focus, vocabulary, conventions, elaboration, and organization in the higher education system of Iran as a developing country. Accordingly, the present study aimed at examining the effect of web-mediated, blended, and purely online learning instructions on EFL learners' achievement in writing skill and sub-skills as well as making pairwise comparisons between the mentioned instructions in terms of EFL learners' overall writing achievement to pave the way for figuring out the most optimal TEI in Iranian EFL contexts.

To meet the mentioned objectives, the following research questions were addressed in this study.

RQ1: Do web-mediated, blended, and purely online instructions have any significant effect on EFL learners' achievement in their overall essay writing skill?

RQ2: Do web-mediated, blended, and purely online instructions have any significant effect on EFL learners' essay writing ability in terms of organization, focus, vocabulary, elaboration, and conventions sub-skills?

RQ3: Is there any significant difference in pairwise comparisons made between web-mediated, blended, and purely online instructions in terms of EFL learners' overall writing achievement?

## 2 Method

### 2.1 Design of the study

The present study had a true experimental pre-test/post-test comparison group design and consisted of three experimental groups. Writing achievement was the dependent variable, on which the effect of web-mediated, blended, and purely online instructions as independent variables were examined and compared.

### 2.2 Participants

In this study, convenience sampling was employed to examine the effect of web-mediated, blended, and purely online learning instructions on EFL learners' essay writing achievement. The anticipation of classroom management challenges induced by the novelty of these instructions and the likelihood of problems arising from insufficient technological devices and facilities as two practical issues convinced the researchers to engage a small number of learners in the study. Moreover, the participation of only those EFL learners that had passed the advanced writing course as a prerequisite for taking the essay writing course restricted the number of participants. Considering the mentioned points, all female undergraduate EFL learners from Azad University, Tehran Branch were requested to participate in a five-session argumentative essay writing workshop. Initially, 71 learners volunteered to participate in the study. However, following the administration of Oxford Quick Placement Test (OQPT), 49 learners with the score of 35–47 (out of 60) were considered as homogenous intermediate learners that were randomly assigned into three experimental groups. They had various first languages including Turkish, Persian, and Kurdish; however, their official language was Persian. Moreover, they were within the age range of 20–28. Participants' detailed demographic information is presented in Table 1.

**Table 1** Participants demographic information

Variables	Total (n = 49)	
Age range	20–24 year	28 (57.1%)
	24–28 year	21 (42.9%)
Distribution in experimental groups	Web-mediated group	18 (36.7%)
	Blended group	16 (32.7%)
	Online group	15 (30.6%)
Score of OQPT	35–39	14 (28.5%)
	40–43	19 (38.8%)
	44–47	16 (32.7%)
First language	Turkish	12 (24.5%)
	Farsi	30 (61.2%)
	Kurdish	7 (14.3%)

## 2.3 Instruments

This study employed a number of instruments to figure out the answers to the research questions as follows: OQPT: This test taken from Afshinfar and Shokouhifar's study (2016) was administered as the homogenizer comprising 60 multiple-choice test-items presented in two sections. The first section of the test consisted of 20 vocabulary and 20 reading comprehension questions while the second section covered 10 grammar and 10 vocabulary questions. The validity and reliability of OQPT have been reported by Geranpayeh (2006) and Allan (2004), respectively.

Teacher guide for presenting the argumentative essay writing: In the present study, a guide was prepared by the researcher to help the essay course instructor to uniformly present the argumentative essay writing across various study groups. The mentioned guide was organized using "Persuasive Writing" by Quinley (2005) and "The Practical Writer with Readings" by Bailey and Powel (2008). The guide consisted of the 'definition', 'structure', and 'one sample of argumentative essay' sections.

Teacher guide for performing WebQuests: The researcher offered a teacher guide to contribute to the precise implementation of WebQuests in all the writing classes. The mentioned guide mainly addressed the concept of WebQuest, its components, and the assumed procedure for its successful implementation.

WebQuest Tasks: WebQuests are scaffolded learning structures that employ online links to appropriate resources on the Internet so that a large percentage of input required by learners to perform a number of sub-tasks to accomplish the main task is provided. The WebQuest.org website as an online hosting system presenting over 20,000 WebQuests was used as the source for selecting four WebQuest tasks. Two TEFL instructors were requested to offer a number of seemingly appropriate topics considering their experience in the essay course instruction as well as EFL learners' background knowledge of, interest in, and familiarity with the topics. All the selected topics in this study reflected real-life situations that engaged learners in comprehending, constructing, and interacting

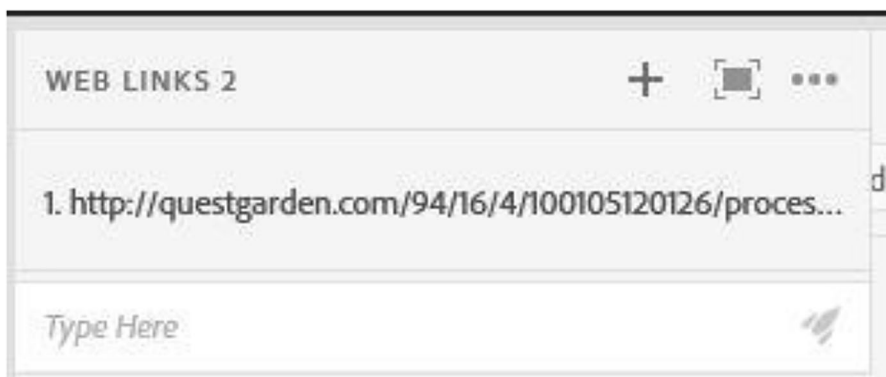


Fig. 1 Screenshot of the box offering the web links of the WebQuest tasks

in English to write an argumentative essay on the topic dealt with through the WebQuests. Moreover, as the selected WebQuests were related to real-life situations, the learners would be more enthusiastic to use the target language to convey their own understanding of the situation, which could be of great significance in presenting written products. Internet safety, cell phones in school, fast food frenzy, and save the environment were four real-life writing WebQuests with different main tasks, sub-tasks, topics, and sources. The web links were provided in the online platform in a special box devoted to this purpose (Fig. 1).

**Adobe Connect software:** Adobe Connect software as a learning management system (LMS) was used for desktop sharing, presentation, conferencing, and remote instruction. This software has capabilities such as screen sharing, multiple meeting rooms per user, unlimited meeting rooms, breakout sessions within a meeting, chats, whiteboards, etc. The capability of the FREE Adobe Connect application in allowing the users to drive meetings from their Android tablet or smartphone was used in the present study. The main rationale for selecting this application was its peculiar capability in providing breakout rooms to achieve

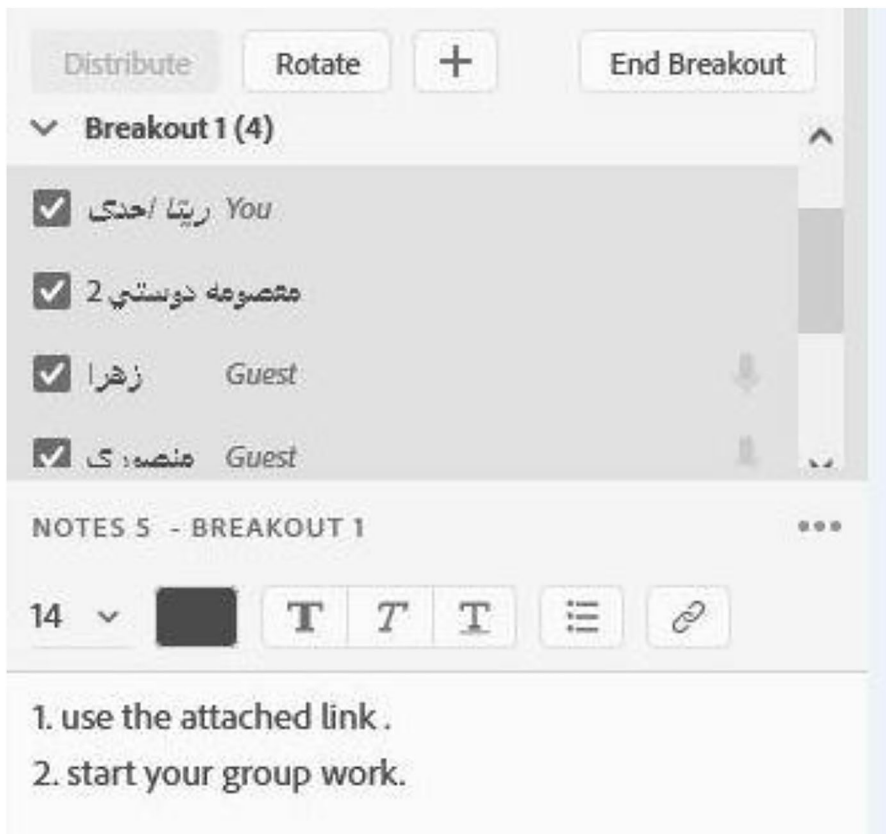


Fig. 2 Screenshot of the breakout room

the pedagogical goals of the study. Breakout rooms provided the opportunity to separate the class into smaller groups for performing the WebQuests that mainly required pair/group works (Fig. 2).

**Pre- and post-tests:** To examine the effectiveness of web-mediated, blended, and online instructions on EFL learners' academic essay writing, the learners in all groups took one round of pre- and post-test process in each writing session.

**The writing scoring rubric:** The adjusted version of writing scoring rubric developed by Wang and Liao (2008) was used to score both the learners' overall writing achievement and their achievements in the conventions, vocabulary elaboration, focus, and organization sub-skills. This rubric had five sub-scales, each consisting of five levels. The accurate spelling, punctuation, and grammar use was scored as the conventions sub-skill. The precise discussion of the main topic of writing was measured as the focus sub-skill. The support of the topic by providing appropriate details was focused on as the elaboration sub-skill. The associated array of ideas was addressed as the organization sub-skill. Furthermore, the proper use of idioms, verb forms, and vocabulary was measured as the vocabulary sub-skill. Learners' pre- and post-tests were scored using this rubric as meticulous explanation was provided for measuring learners' writing achievement.

## 2.4 Procedure

To perform the study, initially the argumentative essay type was chosen by sharing ideas with two TEFL instructors to eliminate the potential effect of the essay type on learners' writing achievement. Then, one TEFL instructor with the experience of holding the essay writing course at the university level was requested to cooperate in the present effortful study as three classes were to be held by the mentioned instructor at various times. In 2017, she got her Ph.D. degree in English Language Teaching from Tabriz University, and since then she started teaching different English courses at the university level. She was always fascinated by reading the latest papers regarding the innovations in the EFL classrooms. The instructor was requested to dedicate sufficient time to read "Teacher guide for presenting the argumentative essay writing" including the underlying tenets of argumentative essay writing as well as "Teacher guide for performing WebQuests" and perform one sample WebQuest task to attain a firm grasp of WebQuests due to their central role in this study.

Following the purposive selection of the TEFL instructor, all volunteer EFL learners that had not taken the essay writing course in the TEFL program of Azad University, Tehran Branch were informed to participate in a five-session argumentative essay writing workshop. Totally, 71 EFL learners enrolled in the workshop and took OQPT, which confirmed the homogeneity of 49 intermediate EFL learners gaining the score of 35–47 (out of 60). Then, the homogenous participants were randomly assigned to one web-mediated learning (WML) group,



one enriched virtual blended learning (EVBL) group, and one purely online leaning (POL) group.

The first experimental group (i.e., WML group) attended the workshop physically at predetermined times. Following the first session over which the basic components of the argumentative essay writing and WebQuest were taught and the EFL learners' comprehension of the mechanisms of WebQuests was checked by the instructor, the remaining four sessions were initiated by taking a pre-test on the target topic of each session. Therefore, the WML group presented four argumentative essay writing pre-tests over the four workshop sessions. The online instructional WebQuest tasks along with their pertinent resources were used in this group to enhance the conventional instruction. The instructor provided technical and pedagogical support for learners during the session. Learners were supposed to perform various sub-tasks such as watching videos, reading articles, discussing the topics in pair or group works, and finally deliver a five-paragraph argumentative essay as the main task. All the essays presented at the end of four sessions were regarded as learners' post-tests.

In the second experimental group, the first step was specifying the type of blended learning model to be employed in the current study. Since a number of researchers have argued that the blended learning, as any combination of conventional and online learning, is an umbrella term with a less definitely agreed-upon definition (Oliver & Trigwell, 2005), the researcher selected the EVBL model to avoid being trapped in the mentioned ambiguity. The second experimental group (i.e., the EVBL group) not only was provided with online sessions but was supplemented with instructional sessions that required learners' compulsory in-person attendance in the class, as well. An EVBL template was designed by the instructor to pave the way for learners' in and outside the class learning. The first session, similar to that of the WML group, was allocated to an in-class session and aimed at familiarizing the learners with basics of WebQuests and the argumentative essay writing. In this session, feedback was received from the learners to check for their proper understanding of the presented concepts. Similarly, the second and fourth sessions were devoted to in-class sessions, over which the learners delivered a pre-test, performed the WebQuests, engaged in pair/group works, discussed the topic, completed all the sub-tasks, and finally wrote their essays as post-tests. These two sessions were supposed to support the learners by the instructor's pedagogical and technical aids. Moreover, the instructor could concentrate on the collaborative atmosphere of the class and learners' communicative interactions through pair/group works. The third and fifth sessions were in turn held online using the Adobe Connect as the virtual learning platform. Identical to in-class sessions, the learners were requested to write a five-paragraph essay on the main topic as the pre-tests at the beginning of the session. Then, the instructor presented the relevant WebQuest and assigned the class into smaller groups using the "breakout rooms" capability of Adobe Connect. The instructor was available to guide the learners online in case of any problem. As an outcome indicating the accomplishment of the WebQuests, the learners submitted their five-paragraph essay writing products that were regarded as post-tests at the end of each session.

The third experimental group (i.e., POL group) merely relied on the Adobe Connect platform to mediate the introductory and instructional sessions. The first session was of great significance for this group as the instructor attempted to elucidate the way of working with the Adobe Connect platform. Moreover, the description of WebQuests as well as the argumentative essay writing type was presented for learners. The remaining four sessions were initiated with writing a five-paragraph essay as the pre-test, followed by performing the WebQuest task, and ended with delivering another five-paragraph essay as the post-test and the ultimate product of the WebQuest.

The participant instructor and another proficient instructor used the writing scoring rubric to score learners' pre- and post-tests to determine their overall and sub-skill achievements. The inter-rater reliability coefficients of 0.75 and 0.79 were indicative of a good agreement between the rates according to Koo and Li (2016).

## 2.5 Data analyses

The elicited data were analyzed using the Statistical Package for Social Sciences (SPSS) software (version 16.0). Six paired-samples *t*-tests were run for each instruction to examine its effect on EFL learners' achievement in writing skill and sub-skills on two occasions from pre-test to post-test. Moreover, considering the involvement of three groups, one-way between-groups ANOVA was used to compare the effect of the three instructions. Since the results of ANOVA revealed a significant difference between groups, post-hoc comparisons were conducted to specify which groups yielded significant results as compared to others. The significance level of less than 0.05 was considered in all analyses.

**Table 2** Paired Samples Test for WEL group

		Mean	Std. Deviation	Mean difference	t	df	Sig. (2-tailed)																																																		
Pair 1	Pre-overall	38.67	4.75	-16.00	-11.27	17	<0.001																																																		
	Post-overall	54.67	4.95					Pair 2	Pre-con	8.78	1.00	-0.77	-2.61	17	0.018	Post-con	9.56	.78	Pair 3	Pre-elab	7.78	1.16	-4.50	-11.30	17	<0.001	Post-elab	12.28	1.36	Pair 4	Pre-org	7.67	1.23	-2.33	-5.89	17	<0.001	Post-org	10.00	1.53	Pair 5	Pre-focus	8.11	1.45	-3.11	-5.94	17	<0.001	Post-focus	11.22	2.10	Pair 6	Pre-voc	6.33	1.23	-5.27	-10.48
Pair 2	Pre-con	8.78	1.00	-0.77	-2.61	17	0.018																																																		
	Post-con	9.56	.78					Pair 3	Pre-elab	7.78	1.16	-4.50	-11.30	17	<0.001	Post-elab	12.28	1.36	Pair 4	Pre-org	7.67	1.23	-2.33	-5.89	17	<0.001	Post-org	10.00	1.53	Pair 5	Pre-focus	8.11	1.45	-3.11	-5.94	17	<0.001	Post-focus	11.22	2.10	Pair 6	Pre-voc	6.33	1.23	-5.27	-10.48	17	<0.001	Post-voc	11.61	1.46						
Pair 3	Pre-elab	7.78	1.16	-4.50	-11.30	17	<0.001																																																		
	Post-elab	12.28	1.36					Pair 4	Pre-org	7.67	1.23	-2.33	-5.89	17	<0.001	Post-org	10.00	1.53	Pair 5	Pre-focus	8.11	1.45	-3.11	-5.94	17	<0.001	Post-focus	11.22	2.10	Pair 6	Pre-voc	6.33	1.23	-5.27	-10.48	17	<0.001	Post-voc	11.61	1.46																	
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	Post-focus	11.22	2.10					Pair 6	Pre-voc	6.33	1.23	-5.27	-10.48	17	<0.001	Post-voc	11.61	1.46																																							
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	Post-voc	11.61	1.46																																																						

Abbreviations: *con* conventions, *elab* elaboration, *org* organization, *voc* vocabulary

### 3 Results

Six paired-samples *t*-tests were conducted for each instruction to investigate whether the instructions have resulted in any improvements in learners' writing skill and sub-skills on two occasions from pre-test to post-test.

Regarding the effect of the WML instruction on EFL learners' overall writing skill and sub-skills, Table 2 indicates that there was a statistically significant increase in the main and sub-skill scores from overall achievement pre-test ( $M=38.67$ ,  $SD=4.75$ ) to overall achievement post-test ( $M=54.67$ ,  $SD=4.95$ ),  $t(17)=-11.27$ ,  $P<0.001$  (two-tailed); conventions sub-skill pre-test ( $M=8.78$ ,  $SD=1.00$ ) to conventions sub-skill post-test ( $M=9.56$ ,  $SD=0.78$ ),  $t(17)=-2.61$ ,  $P=0.018$  (two-tailed); elaboration sub-skill pre-test ( $M=7.78$ ,  $SD=1.16$ ) to elaboration sub-skill post-test ( $M=12.28$ ,  $SD=1.36$ ),  $t(17)=-11.30$ ,  $P<0.001$  (two-tailed); organization sub-skill pre-test ( $M=7.67$ ,  $SD=1.23$ ) to organization sub-skill post-test ( $M=10.00$ ,  $SD=1.53$ ),  $t(17)=-5.89$ ,  $P<0.001$  (two-tailed); focus sub-skill pre-test ( $M=8.11$ ,  $SD=1.45$ ) to focus sub-skill post-test ( $M=11.22$ ,  $SD=2.10$ ),  $t(17)=-5.94$ ,  $P<0.001$  (two-tailed); and vocabulary sub-skill pre-test ( $M=6.33$ ,  $SD=1.23$ ) to vocabulary sub-skill post-test ( $M=11.61$ ,  $SD=1.46$ ),  $t(17)=-10.48$ ,  $P<0.001$  (two-tailed). The mean increase in the overall achievement, conventions, elaboration, organization, focus, and vocabulary scores was -16.00, -0.77, -4.50, -2.33, -3.11, and -5.27, respectively.

Similarly, six paired-samples *t*-tests were run to examine the effect of EVBL instruction on EFL learners' overall writing achievement and their achievement in writing sub-skills on two occasions from pre-test to post-test. Table 3 demonstrates a statistically significant increase in the main and sub-skill scores from overall achievement pre-test ( $M=39.81$ ,  $SD=2.63$ ) to overall achievement post-test ( $M=54.25$ ,  $SD=3.06$ ),  $t(15)=-17.57$ ,  $P<0.001$  (two-tailed); conventions sub-skill pre-test ( $M=8.38$ ,  $SD=0.71$ ) to conventions sub-skill post-test ( $M=10.00$ ,  $SD=1.96$ ),  $t(15)=-3.56$ ,  $P=0.003$  (two-tailed); elaboration sub-skill pre-test

**Table 3** Paired Samples Test for EVBL group

		Mean	Std. Deviation	Mean difference	t	df	Sig. (2-tailed)
Pair 1	Pre-overall	39.81	2.63	-14.43	-17.57	15	<0.001
	Post-overall	54.25	3.06				
Pair 2	Pre-con	8.38	0.71	-1.62	-3.56	15	0.003
	Post-con	10.00	1.96				
Pair 3	Pre-elab	8.06	1.28	-3.75	-7.09	15	<0.001
	Post-elab	11.81	1.83				
Pair 4	Pre-org	7.88	0.88	-3.00	-10.39	15	<0.001
	Post-org	10.88	0.95				
Pair 5	Pre-focus	8.25	1.06	-2.31	-7.73	15	<0.001
	Post-focus	10.56	0.81				
Pair 6	Pre-voc	7.25	1.77	-3.75	-8.66	15	<0.001
	Post-voc	11.00	0.89				

Abbreviations: *con* conventions, *elab* elaboration, *org* organization, *voc* vocabulary

**Table 4** Paired Samples Test for POL group

		Mean	Std. Deviation	Mean difference	t	df	Sig. (2-tailed)
Pair 1	Pre-overall	37.53	3.87	-11.53	-11.59	14	<0.001
	Post-overall	49.07	1.83				
Pair 2	Pre-con	8.20	1.20	-1.20	-4.29	14	0.001
	Post-con	9.40	0.82				
Pair 3	Pre-elab	7.40	1.12	-2.86	-8.91	14	<0.001
	Post-elab	10.27	0.79				
Pair 4	Pre-org	7.47	1.12	-2.66	-11.47	14	<0.001
	Post-org	10.13	0.51				
Pair 5	Pre-focus	7.93	1.66	-2.06	-4.37	14	0.001
	Post-focus	10.00	0.92				
Pair 6	Pre-voc	6.53	1.18	-2.73	-8.27	14	<0.001
	Post-voc	9.27	0.96				

Abbreviations: *con* conventions, *elab* elaboration, *org* organization, *voc* vocabulary

( $M=8.06$ ,  $SD=1.28$ ) to elaboration sub-skill post-test ( $M=11.81$ ,  $SD=1.83$ ),  $t(15)=-7.09$ ,  $P<0.001$  (two-tailed); organization sub-skill pre-test ( $M=7.88$ ,  $SD=0.88$ ) to organization sub-skill post-test ( $M=10.88$ ,  $SD=0.95$ ),  $t(15)=-10.39$ ,  $P<0.001$  (two-tailed); focus sub-skill pre-test ( $M=8.25$ ,  $SD=1.06$ ) to focus sub-skill post-test ( $M=10.56$ ,  $SD=0.81$ ),  $t(15)=-7.73$ ,  $P<0.001$  (two-tailed); and vocabulary sub-skill pre-test ( $M=7.25$ ,  $SD=1.77$ ) to vocabulary sub-skill post-test ( $M=11.00$ ,  $SD=0.89$ ),  $t(15)=-8.66$ ,  $P<0.001$  (two-tailed). The mean increase in the overall achievement, conventions, elaboration, organization, focus, and vocabulary scores was -14.43, -1.62, -3.75, -3.00, -2.31, and -3.75, respectively.

Likewise, six paired-samples  $t$ -tests were performed to address the impact of POL instruction on the writing achievement of learners. According to Table 4, a statistically significant increase was observed in the main and sub-skill scores from overall achievement pre-test ( $M=37.53$ ,  $SD=3.87$ ) to overall achievement post-test ( $M=49.07$ ,  $SD=1.83$ ),  $t(14)=-11.59$ ,  $P<0.001$  (two-tailed); conventions sub-skill pre-test ( $M=8.20$ ,  $SD=1.20$ ) to conventions sub-skill post-test ( $M=9.40$ ,  $SD=0.82$ ),  $t(14)=-4.29$ ,  $P<0.001$  (two-tailed); elaboration sub-skill pre-test ( $M=7.40$ ,  $SD=1.12$ ) to elaboration sub-skill post-test ( $M=10.27$ ,  $SD=0.79$ ),  $t(14)=-8.91$ ,  $P<0.001$  (two-tailed); organization sub-skill pre-test ( $M=7.47$ ,  $SD=1.12$ ) to organization sub-skill post-test ( $M=10.13$ ,  $SD=0.51$ ),  $t(14)=-11.47$ ,  $P<0.001$  (two-tailed); focus sub-skill pre-test ( $M=7.93$ ,  $SD=1.66$ ) to focus sub-skill post-test ( $M=10.00$ ,  $SD=0.92$ ),  $t(14)=-4.37$ ,  $P<0.001$  (two-tailed); and

**Table 5** ANOVA analysis

		Sum of Squares	df	Mean Square	F	Sig.
Post-overall achievement	Between Groups	305.41	2	152.70	11.59	<0.001
	Within Groups	605.93	46	13.17		
	Total	911.34	48			

vocabulary sub-skill pre-test ( $M=6.53$ ,  $SD=1.18$ ) to vocabulary sub-skill post-test ( $M=9.27$ ,  $SD=0.96$ ),  $t(14)=-8.27$ ,  $P<0.001$  (two-tailed). The mean increase in the overall achievement, conventions, elaboration, organization, focus, and vocabulary scores was  $-11.53$ ,  $-1.20$ ,  $-2.86$ ,  $-2.66$ ,  $-2.06$ , and  $-2.73$ , respectively.

One one-way between-groups ANOVA was run to answer the third research question scrutinizing any significant difference between web-mediated, blended, and purely online instructions in terms of EFL learners' overall writing achievement. As Table 5 indicates there was a statistically significant difference at the  $P<0.05$  level in the overall writing achievement scores for the three WML, EVBL, and POL groups:  $F(2, 46)=11.59$ ,  $P<0.001$ . The effect size, calculated using eta squared, was 0.33 for the overall writing achievement. In Cohen's (1988, pp.284–7) terms, the obtained value has been classified as a large effect size.

Post-hoc Tukey HSD test was used to determine the exact place of the difference. According to Table 6, the results indicated that the mean overall writing achievement score for WML group ( $M=54.67$ ,  $SD=4.95$ ) and EVBL group ( $M=54.25$ ,  $SD=3.06$ ) was significantly higher than that of POL group ( $M=49.07$ ,  $SD=1.83$ ). WML group did not differ significantly from EVBL group in terms of the overall writing achievement.

## 4 Discussion

The findings of this study regarding the first and second research questions revealed that EFL learners' overall writing skill and sub-skills improved significantly from pre-tests to post-tests in all the WML, EVBL, and POL groups. A good number of studies including but not limited to studies conducted by Rahayu (2021), Alipour (2020), Kawinkoonlasate (2019), Ebadi and Rahimi (2018), Permana (2017), Norouzifard and Sadighi (2017), and Ghahari and Ameri-Golestan (2013) confirmed the findings of the present study suggesting the successful implementation of novel TEIs in an EFL context.

To justify the obtained findings for the first research question, the role of two arrays of explanations, which are the peculiar characteristic of EFL learners and the distinctive nature of TEIs, appear to be pertinent in this respect.

In this regard, first, the concept of digital natives should be addressed. EFL learners can be considered as digital natives (Kizil, 2017) encircled by videogames, computers, cell phones, webcams, digital music players, and a good number of other

**Table 6** Tukey HSD

Dependent Variable	(I) groups	(J) groups	Mean Difference (I-J)	Std. Error	Sig
Post-overall achievement Comparisons	WML group	EVBL group	0.41	1.24	0.940
	WML group	POL group	5.60*	1.26	<0.001
	EVBL group	POL group	5.18*	1.30	0.001

tools belonging to the digital age. While a notebook and pen might have formed the tool kit of the prior generation of learners in higher education, today's learners physically or virtually attend the university classes armed with smart phones, laptops, iPods, etc. (Riadil, 2020). According to Bullen et al. (2011), the learning characteristics of digital natives comprise their inclination to automatically employ various technological devices, browse and use the Internet rather than a library for research purposes, quickly perform one activity and move to another and occasionally perform numerous activities concurrently, learn by doing rather than being told what to do, work and learn in teams, and work on things that matter. Enjoying the mentioned characteristics, digital native learners raised in digital-saturated world indicated that a media-rich learning environment contributed to and consequently resulted in their writing outperformance (Chen, 2021), which was in agreement with the findings of this study. In fact, the onset and rapid distribution of digital technology over the last few decades of the current century have transformed the way learners process information and think, making it less demanding for them to perform in technology-enhanced instructional settings.

Second, the prosperous findings following the implementation of WML, EVBL, and POL instructions can be attributed to the idiosyncratic features of these TEIs that correspond with the principles of constructivist learning theory (Gilakjani et al., 2013). The mentioned theory “is based on the now commonplace idea that knowledge is actively constructed by the learner” (Prawat & Floden, 1994, p. 37). In contrast to the positivist theory of learning, in which there is a search for “truth” and a singular “reality” for all learners, constructivism allows learners to construct their truths of knowledge from social and personal experiences (Doolittle & Hicks, 2003). The principles of constructivist learning theory include the learners' active role in the construction of knowledge, the importance of social and individual experiences in learning, and individuals' various representations of reality (Doolittle & Hicks, 2003). In line with these principles, TEIs in the current study used the simulated real-life experiences presented through WebQuest tasks to construct a new piece of knowledge by gathering, analyzing, summarizing, and synthesizing the information (Isik, 2018), engage learners in more authentic learning and writing opportunities, increase their participation in writing activities, and improve and trigger their prior knowledge in essay writing (Wen & Walters, 2022). Therefore, it can be claimed that TEIs provided rich information for learners to write high-quality essays, increased learners' familiarity with the vocabulary, sentence structure, idioms, and flow and relatedness of ideas, and eventually resulted in their improvement in the writing skill to present well-developed essays.

Considering the improvement of EFL learners' achievements in writing subskills including conventions, elaboration, organization, focus, and vocabulary from pre-tests to post-tests, focusing on the WebQuest tasks employed in the instructions of this study can pave the way to explain the obtained findings. In conventional instructions, instructors use the main portion of the class time to convey knowledge through lectures and subsequent discussions. However, as this instruction appears outdated and inefficient in an era of advanced technology, the present study incorporated WebQuest tasks to substitute the traditional lectures in the WML, EVBL, and POL instructions. March (2004), the co-developer of the concept of

“WebQuest”, has described this term as a scaffolded learning structure. Therefore, it can be stated that WebQuests are developed in accordance with the principles of the scaffolding theory, which uses various instructional techniques to facilitate learners’ progressive movement toward achievement of a deeper and better learning (Reingold et al., 2008). Instructional scaffolding acts as a bridge connecting what learners have learned and what they are supposed to perform at a specific point in their learning process. Review of the literature indicates that scaffolding instruction improved learners’ writing skill (Khanza & Nufus, 2019; Pasand & Tahriri, 2017; Pinchai, 2017). For instance, the study conducted by Piamsai (2020) revealed the significant improvement in the post-test scores in all aspects of writing skill, i.e. organization, lexical variety, task completion, and structural variety and accuracy. In case of the essay writing products delivered at the end of each session in the current study, the instructor scaffolded the instruction in two ways. First, the instructor broke up the main task, i.e., the essay writing, into smaller sub-tasks. Second, the instructor provided the support to perform each sub-task by offering the pertinent web links. The use of web links equipped the WebQuest tasks with the feature of authenticity. The employed WebQuest tasks utilized authentic materials and tasks as they used real sources and original documents like articles and videos and presented a real-life issue and problem that involved learners in comprehending, analyzing, and ultimately solving the problem. Consequently, the learners’ engagement in performing authentic WebQuest tasks smoothly supported them to acquire the required background information to improve their focus sub-skill by explicitly addressing the main writing task, elaboration sub-skill by presenting sufficient information to support the writing topic, organization sub-skill by offering a connected stream of ideas, conventions sub-skill by writing well-developed sentences in terms of grammar, punctuation, and spelling, and finally vocabulary sub-skill by improving their knowledge of idioms, verb forms, and diction.

The results of comparisons made between the WML, EVBL, and POL groups to respond to the third research question indicated that WML and EVBL groups outperformed the POL group in the overall writing achievement. Although there was a dearth of literature comparing all these three instructions simultaneously, the results of this study were verified by the findings of studies conducted by Bataineh et al. (2020), Albiladi and Alshareef (2019), Oweis (2018), and Ju and Mei (2018), which reported the failure of the online learning instruction. In contrast, the findings of Alipour (2020) and Nugroho (2020) did not resonate with those of the present study. The presented findings can be justified in the light of technology-related dimension, the interaction dimension elucidated using theory of social constructivism, and the conventional perspective of education dimension.

First, the technological challenges that the instructor and learners came across through the implementation process of POL instruction could vindicate the lower achievement of POL learners as compared to other groups (Atmojo & Nugroho, 2020). Although the first session was devoted to familiarize the learners with the Adobe Connect as the LMS, problems with the platform disseminated a sense of inconvenience and even unfamiliarity with how to properly operate in the online instructional environment among the learners. In EVBL instruction, similar problems were solved by focusing the face-to-face sessions on answering learners’



difficulty in using the platform. In-class sessions provided the opportunity for learners to directly ask questions and get face-to-face intensive guidance and support from the instructor. Regarding the problems in the POL group, the learners were recurrently reminded to express their platform-related problems via personal chat with the instructor. Thanks to the employed solution, almost all problems reported by learners, with the exception of the infrequent platform downtimes, were solved following the third online learning session. However, the biggest technological challenge as noticed in previous studies was Internet connectivity (Asgari & Salehi, 2018; Sari & Wahyudin, 2019). Internet connection failed or slowed down at unanticipated moments and crashed and cut all learners from the online class. Furthermore, it was not feasible to satisfy the due time in the accomplishment of WebQuest sub-tasks due to poor internet connection. As problems with technical features are very time consuming, POL instructions encounter serious problems, which necessitates improving the quality of networks.

Second, the obtained findings could be justified in the light of the theory of social constructivism as a sociological theory of knowledge. One of the main principles outlining this theory posits that learners construct their knowledge through their interaction with other individuals (Narayan et al., 2013). The better performance of WML and EVBL groups could be attributed to the development of a sense of learning community and high-quality interactions among learners. The sense of belonging to a community, which contributes to improvement of learner-teacher and learner-learner interactions, has been described by McMillan and Chavis (1986) as the feeling of mattering to one another and to a group, the feeling of belonging, and the feeling of commitment to each other. The integration of both online and conventional learning environments reserved the benefits of these instructions and improved the sense of a learning community among learners in WML and EVBL groups. It can be stated that these two instructions could offer a relatively higher chance of forming a strong learning community during in-class meetings and establish more interactions, engagements, and cooperations among learners that could be noted as the key to learners' higher achievements in the writing skill (Smyth et al., 2012). In other words, conventional in-class face-to-face interactions taking place in WML and EVBL groups were distinct from virtual interactions available in the POL group. Although the integration of inherently-interactive WebQuest tasks as well as the utilization of break-out rooms in the POL instruction was supposed to provide a better communicative opportunity and yield productive discussions among groups of learners, it seems that poor internet connectivity negatively affected the nature, quality, and the amount of appropriate live interactions in POL group (Zulaikha Mohd et al., 2021). For instance, body language, facial expressions, eye contact, subtle emotions, and tone of voice were poorly communicated in POL interactions (Alhih et al., 2017; Dhawan, 2020). Although webcams were turned on during the discussions in online sessions, the learners preferred to turn them off to accelerate the Internet connection. The mentioned point would certainly disturb the nature of interactions and communications in POL group. The mentioned issues can be considered as probable threats posed to the success of POL instructions in the current study.



Third, the conventional perspective of education in Iran may explain the poor performance of POL group as compared to the other two groups. According to Farhady et al. (2010), the programs of higher education in Iran implement a positivistic and transmission-oriented approach. As a result of following the mentioned approach in the Iranian EFL context, Safari (2016) considers learners as the mere receivers of knowledge from instructors conveying a vast amount of information. Therefore, integration of TEIs including WML, VEBL, and POL in the Iranian context requires a paradigm shift from transmission-oriented approach to technology constructivist approach, which is in turn accompanied with a change in the learners' role. Technology constructivist approach assigns a more active role to learners, who are supposed to equip themselves with additional and new responsibilities in online instructions. For instance, Roddy et al. (2017) stated that learners should have a) technological literacy to navigate the Internet, use a word processing program, download software, and create new documents, b) time-management skills to submit assignments and have a routine study schedule, and c) persistence skills to endure technical problems, work daily on the presented issues in online classes, and request help in case of need. Since the application of technology constructivist approach can be regarded as a relatively novel phenomenon in Iran (Khatoony & Nezhadmehr, 2020), it can be claimed that a shift in roles from reliance on an external authority (i.e., instructor) to an internal one (i.e., the learners themselves) should be gradual and meticulously planned to avoid any rapid transition in this regard (Adedoyin & Soykan, 2020). Getting accustomed to new roles seems to be facilitated in WML and VEBL instructions via in-class meetings while learners in POL group experienced an abrupt change of roles, which could justify their lower performance in writing achievement as compared to the other groups.

## 5 Limitations and future scope of the study

Inherent to any research study, a number of limitations that should be attended to in future studies were noted in the present study. As the small sample size of the study might undermine the generalizability of findings, it is suggested to conduct additional research with a larger scope, both in terms of duration and sample size including learners at different age ranges and proficiency levels in different instructional contexts in Iran. In addition, the present study focused on the writing skill, argumentative type of essay writing, and the enriched virtual blended learning model. Therefore, it is proposed to conduct further studies on other language skills, various types of essay writing, and the other types of blended learning consisting of rotation model, the self-blend model, and the flex model. Moreover, numerous variables including the quality and quantity of feedback on assignments, the attitudes toward online assessment, and last but not least the role of instructors and learners can be addressed in future studies to obtain more robust findings in this regard. In addition, the present study did not investigate the concept of interaction in the studied instructions. As the type of interaction in these instructions seems to be incomparable to the interaction taking place in the traditional instruction, it deserves further examinations.

## 6 Conclusion

The present study revealed that WML, EVBL, and POL instructions employing WebQuest tasks facilitated the learning process, particularly that of the writing skill and sub-skills. It can be claimed that new TEIs, when well-implemented, can inspire the improvement of instructional practices in higher education and support a shift from a primarily ‘knowledge-transfer’ approach of content delivery to a more ‘knowledge-construction’ approach of instruction. In fact, appropriate TEIs could help instructors to organize more dynamic teaching and learning opportunities, provide more authentic materials resembling the natural setting in which the target language is used, facilitate learners’ participation in learning by minimizing their passive presence during instructors’ lectures, make changes in education to be a collaborative and interactive process, and facilitate communication and teamwork among learners.

Moreover, the findings indicated that learners in WML and EVBL groups outperformed those in the POL group. As the learners used to be physically present in the instructional environment and rely on the instructor, it seems that promoting better outcomes in POL environments necessitates being highly sensitive to learners’ readiness to participate in these settings. The mentioned objective can be attained by offering required trainings and devoting sufficient exposure to identical online instructional platforms. The prerequisite duration of training and exposure varies considering the learners’ interests and skills in, and familiarity with acting in online learning environments. Therefore, it can be stated that offering more WML and EVBL instructions can facilitate, support, and offer an opportunity for learners and even instructors to more smoothly shift to prosperous POL instructions as destructive technical and affective issues can be overcome by being acquainted with online learning platforms in WML and EVBL settings.

The promising findings of this study can give a hint to instructors about how to enhance their instruction and respond to the needs and desires of native digital EFL learners in terms of employing novel technological means and instructions. Moreover, syllabus designers can benefit from the presented findings in designing more up-to-date and effective lesson plans to pave the way for incorporating full TEIs. In addition, the stakeholders and administrators can postulate on the presentation of more teacher training courses or professional development programs to advance instructors in their career by introducing new instructions.

**Abbreviations** EFL: English as a Foreign Language; EVBL: Enriched Virtual Blended Learning; LMS: Learning Management System; OQPT: Oxford Quick Placement Test; POL: Purely Online Learning; SPSS: Statistical Package for Social Sciences; TEI: Technology-Enhanced Instruction; WML: Web-Mediated Learning

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## Declarations

**Research involving human participants and/or animals** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (Faculty of Foreign Languages, University of Isfahan) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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