

Integrating Digital Multimodal Composition into EFL Writing Instruction

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Background: Digital multimodal composition has recently received paramount attention in the instruction of second language writing. Although the merits of digital multimodal composition have widely been acknowledged by many scholars, the instruction of English writing has still remained monomodal in Iran.

Purpose: The present quasi-experimental study aimed to investigate the differential impacts of the two types of writing (multimodal/monomodal) on English as a Foreign language (EFL) learners' writing ability in terms of content, communicative achievement, organization, and language across five times.

Method: To this end, two intact groups, including 59 EFL learners at a university in southeastern Iran participated in the study. The participants were assigned into two comparison groups of multimodal (n = 30) and monomodal (n = 29) compositions. The students in the multimodal group composed five digital essays, while the monomodal group used only the textual mode to produce their essays throughout the semester. Following a repeated measures design, the researchers assessed the participants' writing ability across five times. A mixed between-within ANOVA was conducted to address the research questions.

Results: The results revealed that both groups showed significant improvement in their writing ability across time. Furthermore, the multimodal group outperformed the monomodal group in their writing ability.

Implication: The findings suggest that writing instructional practices in Iran should be redefined and updated to accommodate the needs and expectations of the twenty-first century learners.

Keywords: multimodality, writing ability, writing instruction, digital writing, writing instructional practices

Introduction

Technology has remarkably changed not only written communication but also writing instruction (Pegrum, 2009; Skians, 2017). Thanks to the technological advances and their subsequent social as well as pedagogical demands, the composition field has witnessed astonishing shifts in writing instruction one of which is digital multimodal composition (DMC). As a breakthrough in writing instruction, DMC which incorporates textual, visual, and aural modes has become extremely popular in English writing courses (Jewitt & Kress, 2003). With the paradigm shift of writing from monomodal (textual) to multimodal activities, language learners have been provided with unprecedented ways of meaning-making through a variety of modes, including text, image, and sound (Ferdig & Pytash, 2014). Consequently, the transition from alphabetic texts to

multimodal communication led to the widespread use of websites, wikis, blogs, and social networks among language learners (Takayoshi & Selfe, 2007). Many scholars in the field of composition studies have advocated DMC because multiple modes in this type of writing provide multiplication of meanings (Bax, 2011; Mayer, 2009; Mayer & Moreno, 2003) and make the learners more engaged in producing the output needed to develop their language competence (Swain & Lapkin, 1995; Terrell, 2011). Moreover, multimodal composition, as a kind of creative writing with flexible and appealing processes, leads to the enhancement of motivation to further writing ability among the second language (L2) learners (Dymoke & Hughes, 2009).

Followed by the advances in technology and their subsequent social demands, astonishing pedagogical shifts occurred in English language teaching (ELT)

and new modes of writing have been provided for the language learners to keep up with the latest discourse (Baron, 2014; Rance-Roney, 2010; Skains, 2017). Since the beginning of the 21st century, digital multimodal writing has gained prominence and its benefits on developing L2 writing ability have been supported by a good number of researchers in the field (Cope & Kalantzis, 2015; Garcia & de Caso, 2006; Grapin & Llosa, 2020; Jiang & Ren, 2020; Kern & Schultz, 2005; Lutkewitte, 2014; Warschauer, 2009).

Traditionally, monomodal activities have dominated English as a foreign language (EFL) writing instruction in Iran where much emphasis is put on the textual mode than the image or sound which are often recognized as decorations to the written text (Mohiti Asli, 2019; Oldakowski, 2014). With regard to the technologically-laden and multimodal communication among EFL learners as digital natives, it is expected that they find traditional composition outdated and boring due to the disparity between their literacy practices in and out of writing classes (Hundley & Holbrook, 2013; Intrator & Kunzman, 2009; Skains, 2017).

Consequently, understanding the impact of DMC on the writing ability of language learners may be the first step to appropriately plan, effectively instruct, and improve the quality of the EFL learners' writing. Although the implementation of multimodality has widely been acknowledged by many scholars in the composition field, the gap still exists between theories on multimodality and their practical benefits in writing classrooms. As a result, a number of researchers have called for the empirical studies investigating the effectiveness of multimodal composition in writing classes in different contexts (Anderson & Kachorsky, 2019; Canagarajah, 2006; Khadka & Lee, 2019; Lim & Toh, 2020; Moje, 2009). In line with the related literature, the present study aimed to investigate the differential effects of the writing type (multimodal/monomodal) on Iranian EFL learners' writing ability across time.

Literature Review

Multiliteracies and Multimodality

Historically, the New London Group (1996) first introduced the concept of multimodality as "The integrated meaning-making systems that interact with each other through multiple processes of linguistic, visual, audio, gestural, and spatial meanings" (p. 7). Subsequent to the introduction of multimodality, the New London Group (1996) proposed ways to change teaching and learning

paradigms in response to the emerging forms of communication. They introduced a multiliteracies framework emphasizing that the inevitable changes in our daily communication influence educational practices. This endeavor implied the need to integrate digital tools to adjust the teaching practices to the learners' needs and expectations (New London Group, 1996). In other words, the ubiquity and proliferation of digital tools resulted in the new notion of digital literacies in which all modes of communication complement each other in the meaning-making process (Crystal, 2011; Hockly, 2012).

We propose here a multiliteracies framework as a pedagogical response to multimodality aimed at integrating the educational practices which connect real world experiences to the classroom contexts (Cope & Gollings, 2001). As the theoretical framework of the present study, the multiliteracies framework expanded the traditional notion of literacy and stressed the necessity of reforming the pedagogical practices with the purpose of enabling language learners to participate in diverse discourse communities.

The underlying mechanism of the effect of multimodality on cognitive processes during learning lies in Mayer's Cognitive Theory of Multimedia Learning (CTML), according to which the human brain selects and organizes a multimedia presentation of words, pictures, and auditory information in a dynamic manner (Mayer, 2009). Three assumptions of dual-channel, limited capacity, and active processing form the basis of this theory. Dual-channel assumption refers to a processing system which includes dual channels for visual/pictorial and auditory verbal processing. Limited capacity assumption states that each channel has a limited capacity for processing information. And finally, active processing assumption suggests that active learning involves coordination of cognitive processes like filtering, selecting, organizing, and integrating information based upon prior knowledge. The rationale for the theory of multimedia learning is that learning occurs more deeply when pictures accompany words (Mayer, 2003; Mayer, 2009). Mayer's cognitive theory of multimedia learning advocates a learner-centered approach based on the constructivist view of learning through which the learners construct their own learning through interaction of multiple modes. From a pedagogical point of view, students who benefit from multimodal learning achieve a higher performance and remember the information better (Mayer & Moreno, 2003).

Relying on the cognitive theory of multimedia

learning, Scheiter et al. (2017) acknowledged the role of multimodality in learning and concluded that sequential presentation of text and pictures might help learners in processing the information. In their study, Scheiter et al. (2014) claimed that multimodality is advantageous due to the dual coding in memory that contributes to creating more associations to long-term memory. They also maintained that the potentials of multimodal texts to enhance learning cannot be ignored provided that the learners are sufficiently instructed to achieve the highest performance.

Multimodal Instruction of Writing

With the paradigm shift in written communication, outstanding scholars in the field of composition have begun to argue that these pedagogical changes need to be effectively addressed by educators. For instance, Takayoshi and Selfe (2007) assert that due to the extensive use of digital technologies in recent years, language learners need to be exposed to a variety of modes in writing courses. They also warned that if composition courses focus solely on monomodal type of writing, there is the risk of making classroom composition activities irrelevant to the students' contemporary practices of communication.

Referring to the necessity of updating the teaching practices for writing instruction, Luke (2000) also declared "New times call for new literacy practices" (p.70). Well-known pioneers, Hawisher and Selfe (2004), also claimed that as societies undergo enormous digital changes, students need to be prepared for emerging technologies and recent forms of communication.

As a consequence, new technologies have forced scholars to continually redefine text to include compositions that communicate in multiple modes (Kress, 2003). As writing scholars have moved to redefine texts, they also force instructors to reconsider their goals for writing courses due to the multi-sensory (visual & auditory) function which makes information delivery relatively easy. Through multi-sensory integration, multimodal texts brought many changes in writing instruction and improved the ways that students received the new information. Unlike the past, language learners do not solely depend on paper-based material, rather they utilize a variety of multimodal materials for their meaningful language learning (Sankey, 2006).

A substantial body of research has discovered the enhancing role of DMC in the development of writing ability and the necessity of its integration as a

technique to further the cognitive aspect of writing (Cope & Kalantzis, 2015; Garcia & de Caso, 2006; Grapin & Llosa, 2020; Jiang & Ren, 2020; New London Group, 1996) and to connect out-of-school and in-school literacy practices in the digital age (Yeh & Mitrich, 2020; Yi et al., 2020). More specifically, Nobles and Paganucci (2015), Kimmons et al. (2017), and Vandommele et al. (2017) investigated the effect of multimodal writing on developing the writing ability of learners. The findings of all these studies revealed that multimodality intervention could enhance the learners' writing ability. Moreover, the research examining the effect of time and multimodality on learners' writing outcome revealed that the effect of time on writing ability development was significant (Bae & Lee, 2012; Wang & Chen, 2018). More importantly, Li and Akoto (2021) reviewed 26 articles on L2 digital multimodal composition published from 2010 to 2020 and identified three main research strands of DMC process (Jiang et al., 2020; Shin et al., 2020; Unsworth & Mills, 2020), students' perceptions of DMC (Jiang & Gao, 2020; Jiang & Luk, 2016; Kim & Bechler, 2020; Zhang & O'Halloran, 2019) and the effects of DMC (Lee et al., 2021; Unsworth & Mills, 2020). Exploratory qualitative studies focusing on students' perceptions and DMC processes in ESL/EFL contexts were more dominant than the investigation of the effects of DMC.

Although empirical evidence in support of digital multimodal composition is not scarce, the results are considerably inconclusive. Some researchers in the field voiced reservations about the mere contribution of DMC to the improvement of the writing outcome (Agee & Altarriba, 2009; Collins & Pascarella, 2003; Jiang, 2018; Mehlenbacher et al., 2000; Neuhauser, 2002; Sapp & Simon, 2005). It is to be noted that in some meta-analysis studies, several scholars doubted over the appropriate design and assessment in the previous multimodal pieces of research; for example, they claimed that most studies were quantitatively conducted based on correlational designs. As another caveat, the use of an elaborate and a standard rubric for writing ability assessment, has seldom been reported in the related literature (Anderson & Kachorsky, 2019; Kimber & Wyatt-Smith, 2010). The other reason for the inconsistency of the results from the previous studies may lie in the sociocultural and ethnographical disparities between different study contexts (DePalma & Alexander, 2015; Skians, 2017).

Overview of the Study

Given that Iran has fallen behind in technology integration in L2 writing instruction while emerging

technologies are on the rise (Mohiti Asli, 2019; Naghdipour, 2016; Naghdipour & Koç (2015), it seems vital to deploy more effective and innovative pedagogical approaches to better accommodate the learning needs of the digital natives in L2 writing classes.

The point is that empirical studies devoted to examining the practical impacts of digital multimodal composition (especially photo-essay type) on the English writing ability of EFL learners at different contexts have only scratched the surface. In light of the ongoing digital advances and the importance of writing as an essential skill in undergraduate as well as graduate and postgraduate programs, it is important to be aware of the potentials of the new and emerging techniques and to investigate their effect in writing classes. Trying to fill the gap between theory and practice, considering the inconsistency in the literature, and taking the necessity of updating English writing instruction into account in Iran, the researchers of the present study aimed to explore the differential impacts of the writing type (multimodal/monomodal) on Iranian EFL learners' writing ability across time. Accordingly, two research questions motivated the study:

- RQ1. Do multimodal compositions have more differential impacts on learners' writing ability (in terms of content, communicative achievement, organization, and language) than monomodal compositions?
- RQ2: Do multimodal and monomodal compositions affect writing ability components (content, communicative achievement, organization, and language) differently across time?

Method

Participants

The participants were 59 sophomore students of English as a foreign language at a university in southeastern Iran. In the multimodal group, 82.8% of the students were female and 17.2% were male with the average age range of 19 to 24 ($M = 20.3$, $SD = 2.4$). In the monomodal group, 80% of the participants were female and 20% were male within the age range of 20 to 26 ($M = 21.8$, $SD = 1.7$). All the participants were Persian native speakers and had received at least eight years of English education; none of them had ever been to an English speaking country. Convenience sampling was used for the current study because the participants were accessible to the researchers.

Two intact groups of students of Writing II course in the EFL curriculum were assigned to the multimodal

and monomodal groups. Multimodal ($n = 30$) and monomodal ($n = 29$) groups' English proficiency level was assessed through the University of Michigan Examination for the Certificate of Competency in English (ECCE) and, based on the results, they were at the intermediate level of English proficiency (B2 level).

For Iranian undergraduate EFL learners, Writing II is a compulsory course administered in the second year of the four-year undergraduate program. In this course, students are instructed on developing English essays. It is to be noted that the participants had not been exposed to multimodal instruction of writing in their curriculum prior to the study. Furthermore, a post hoc power analysis was conducted using G Power.

Considering the medium effect size f ($ES = 0.25$), with an $\alpha = .05$, and participants of the present study ($N = 59$), the statistical power for the sample size calculated by G Power was 0.86 for between-within group comparison.

Design

The present quasi-experimental study used repeated measures design for data collection and analysis. Type of writing (multimodal/monomodal) and time served as the independent variables whereas writing ability was the dependent variable including four subscales: Content, communicative achievement, organization, and language.

Assessments and Measures

The instruments used in the current study were English proficiency test, Microsoft Photo Story 3/ Photo Story Video Maker, Word Processing Software, and Writing Assessment Scale.

English Proficiency Test

As the first instrument of the study, University of Michigan Examination for the Certificate of Competency in English (ECCE) was used to assess the participants' English proficiency level. This test included a 100-item paper-based examination of grammar, vocabulary, and reading (GVR) sections with each item having one score (max = 100). The allotted time for this exam was 80 minutes. Prior to the experimentation, it was administered at the outset of the semester.

Digital Writing Ability

The digital writing ability of the participants was measured through Microsoft Photo Story 3 for Windows or Photo Story Video Maker for mobile phones depending on the participants' preference of producing their multimodal projects (photo essays) by laptops or cell phones; no matter which one they used, the steps for doing their projects were the same. These two pieces of software were selected since they could be easily and freely downloaded. They are fast and easy applications for generating video stories and sharing them via social networks. These applications allow users to create a visual story (show and tell presentation) from their digital photos and provide users with the possibility of adding text, effects, transitions, and background music to produce photo essays.

Monomodal Writing Ability

The monomodal writing ability of the EFL learners was assessed by Word Processor Software through which the participants in monomodal group produced their essays. Word Processor is a software that lets its users type, edit, and format texts as virtual documents. It has additional features to customize the style of the texts, including spell-check, grammar check, text and font formatting, page layout, and word count options. The only mode used by monomodal group participants was the textual one.

Writing Assessment Scale

The final instrument of the study was Writing Assessment Scale (Appendix) developed with reference to Common European Framework of Reference for Languages (CEFR), which is divided into four subscales: Content, communicative achievement, organization, and language. Content refers to how well the learners have accomplished the task; communicative achievement is defined as how appropriate the writing is for the task; organization means the way the learner puts the parts of the writing together in a logical order; and finally language subscale refers to the appropriate use of vocabulary and grammar (Cambridge English Language Assessment, 2016).¹ The scores at each subscale ranged from 0 (*as the lowest*) to 5 (*as the highest*) the sum of which (four subscales) could range from 0 to 20. In order to ensure the interrater reliability for composition scores of both multimodal and monomodal groups, a university professor who had been teaching English writing for 14 years was invited to score the compositions after one of the researchers had scored them. The cases of discrepancy

between the two raters were discussed and an agreement was reached on the type of errors for which the participants lost score. It is to be mentioned that the interrater reliabilities calculated for the multimodal and monomodal compositions were 0.83 and 0.79, respectively.

Method

First of all, the participants signed informed consent forms to take part in the study and were ensured that their anonymity would be strictly protected. They were also informed that they could withdraw from the study at any stage with no academic consequences. Prior to the experimentation, the University of Michigan Examination for the Certificate of Competency in English (ECCE) was administered to the participants to assess their English proficiency level. Based on the scoring rubric of the test, the participants' scores fell within B2 level, which represents the intermediate level of English proficiency. Afterwards, the students in both groups sat for a semester-long experimentation for 12 sessions of 90 minutes. Both multimodal ($n = 30$) and monomodal ($n = 29$) groups were instructed by one of the researchers who also served as the data collector. Attempts were made to provide the two groups with equal instruction opportunities with regard to class time (90-minute sessions) per a 12-session semester.

In the first two sessions of the semester, explicit instruction was provided to the students of both groups on the structure and organization of cause and effect essays. Multimodal and monomodal groups were required to deliver their compositions every other week. On odd sessions, the lecturer introduced two topics one of which the participants should choose to write about and on even sessions, students' writings were discussed and feedback was provided by the lecturer as well as the students. Totally, ten cause and effect essay topics about health issues as well as social, educational, and environmental concerns were presented to the participants of each group and they selected five of their favorite ones. To ensure the same conditions for both groups, time was constantly kept by the lecturer as the students were working on their tasks.

Teaching Procedure in Multimodal Group

The lesson started with a comparison between multimodal and monomodal writing so that the students could explore the similarities and differences between them. Each session, the participants were required to produce a video of 5 minutes in length. Students were informed that their video productions

¹ Cambridge English Language Assessment. (2016). *Assessing writing performance*. <https://www.cambridgeenglish.org>.

should have a relevant content, a cause and effect essay organization, relevant vocabulary and well-formed structures, as well as appropriate image and music for the content. The instruction was also based on technical integration of three modes of text, image, and sound as well as the focus on the choice of color for textual mode, font size, photo effects and transitions, timing of videos, and video editing techniques. Moreover, four components of writing ability and scoring scheme were explained to the learners. Finally, two videos were presented to the multimodal group to discuss different features they needed to use. From the third session on, the participants were required to produce their videos on odd sessions and discuss them with the lecturer and students inside the classroom on even sessions. Using Microsoft Photo story 3 or Photo Story Video Maker applications, the students in the multimodal group composed five multimodal tasks within the class with the time limit of one hour on the task and 30 minutes of the class time on odd sessions were devoted to discuss the probable problems that the learners might face while composing multimodally. For each task during the semester, students created a video about their favorite topics in which they brought three modes (text, image, & sound) together. The topics the students wrote about were as follows:

1. Main causes of obesity among Iranian teenagers
2. Positive effects of soft music on human body
3. Major causes of water pollution in Iran
4. Negative effects of social networks on Iranian youths
5. Damaging effects of bullying on primary school children

The final videos were emailed to the lecturer to be viewed and scored. The participants could monitor their peers' compositions in the classroom and felt free to give comments on each other's multimodal writings the next session that they attended the class. Ultimately, the lecturer provided feedback on the students' essays to teach them how to select the appropriate language, photo, and sound. Feedback was also provided on the relevance of content to the task, the appropriate and straightforward use of complex ideas, the proper organization of the essay through coherence and cohesive devices, and the appropriate use of vocabulary and grammatical forms.

Teaching Procedure in Monomodal Group

In the first two sessions of the semester, the participants were explicitly instructed on the proper use of relevant content, appropriate ideas, coherence and cohesive devices, unity, relevant vocabulary, and

well-formed structures. The organization of cause and effect essays was also taught to them. Two samples of cause and effect essays were also presented and discussed in the classroom. The topics for monomodal group were as follows:

1. Major causes of exam anxiety among university students
2. Positive effects of doing regular exercise
3. Main effects of climate change on natural resources
4. Negative effects of divorce on children
5. Major causes of insomnia among the elderly

The monomodal group used Word Processor Software to compose their essays on their favorite topic solely through the textual mode with exactly the same time limit as the multimodal group (one hour for each task). When the time on the monomodal writings was finished, the students emailed their writings to the lecturer for scoring. The students were required to write their monomodal essays on odd sessions and during the final 30 minutes of the class time, the probable problems of the students in monomodal compositions were discussed and answered. Just as the multimodal group, the learners in the monomodal group could also make comments on their classmates' compositions the next session after they completed their monomodal essay. And finally, the feedback session was completed by the lecturer's comments on the students' essays composed through the textual mode.

Noteworthy to mention is that each participant had a portfolio consisting of five writing scores for either multimodal or monomodal essays assigned to them throughout the term. Unlike many studies conducted in the field of L2 compositions, the present research used the standard rubric of the Writing Assessment Scale developed by reference to Common European Framework of Reference (CEFR) to score the participants' writing ability. The total score for the participants' writing ability consisted of their scores on four subscales of this rubric: content, communicative achievement, organization, and language.

Data Analysis

Repeated measures design was used to assess the differential impact of the type of writing (multimodal/monomodal) and time variables on the writing ability of the EFL learners. In an attempt to respond to the research questions, the authors used a mixed between-within ANOVA to investigate the impact of the type of writing (multimodal/monomodal) and

time as the second independent variable on the EFL learners' writing ability in terms of content, communicative achievement, organization, and language.

Results

The research questions were specifically concerned with whether multimodal composition had more differential impact on the learners' writing ability and whether the participants' writing ability changed across time. Table 1 summarizes the descriptive statistics of writing ability of both multimodal and monomodal groups across five times.

RQ1: Do multimodal compositions have more differential impacts on learners' writing ability (in terms of content, communicative achievement, organization, and language) than monomodal compositions?

Following a repeated measures design, the researchers conducted a mixed between-within ANOVA to assess the effect of two different interventions (multimodal/monomodal compositions) on the writing ability of

EFL learners across five times. The homogeneity of inter-correlations or the equality of the covariance was tested using Box's M statistic with no violation noted. Furthermore, the homogeneity of variances for within-subjects and between-subjects factors was proved using Levene's Test of equality of error variance and the assumption had not been violated. As Tables 2 and 3 report, there was a significant interaction between the type of writing and time, Wilks' Lambda = .310, $F(4, 54) = 29.64, p < .001, \eta^2_p = .38$ (large effect). There was a substantial main effect for time, Wilks' Lambda = .195, $F(4, 54) = 55.72, p < .001, \eta^2_p = .53$ (large effect) with both groups showing an improvement in their writing performance across five times.

Moreover, the main effect comparing the effect of two types of writing on writing ability was also significant Wilks' Lambda = .310, $F(4, 54) = 29.64, p < .001, \eta^2_p = .10$ (large effect) which suggests there is a significant difference in the effectiveness of digital multimodal composition in writing ability improvement.

Figure 1 demonstrates the interaction between the type of writing (multimodal/monomodal) and time.

Table 1

Descriptive Statistics of Writing Ability of Multimodal and Monomodal Groups across Time

Group	Time	Mean	SD	Group	Time	Mean	SD
Multimodal	Time 1	13.80	2.71	Monomodal	Time 1	13.72	2.75
	Time 2	14.53	2.73		Time 2	13.76	2.86
	Time 3	15.87	2.47		Time 3	13.79	2.47
	Time 4	16.47	2.37		Time 4	14.07	2.45
	Time 5	17.00	2.21		Time 5	14.28	2.48

Table 2

Mixed Between-Within ANOVA of Writing Ability for Multimodal and Monomodal Groups across Time

Effect		Sum of Squares	Df	Mean Square	F	p-value	Partial Eta Squared
Within-Subjects	Time	140.29	4	35.07	64.899	.000	.53
	Time × Group	76.97	4	19.24	35.610	.000	.38
	Error	123.22	228	.54	-	-	-
	Between-Subjects	Group	190.92	1	190.92	6.260	.020
	Error	1739.50	57	30.52	-	-	-

Table 3

Multivariate Tests for Writing Ability

Effect	Multivariate Test	Value	F	Hypothesis	Error df	p-value df
Time	Wilks' Lambda	.195	55.72	4	54	.000
Time × Group	Wilks' Lambda	.310	29.64	4	54	.000

As illustrated, the interaction effect between the type of writing and time was significant which implies the effect of the type of writing on writing ability is influenced by the amount of time spent on writing tasks. In other words, a longer time spent on writing tasks resulted in the participants' improved writing ability.

Figure 1

Writing Ability Scores of Multimodal and Monomodal Groups across Time

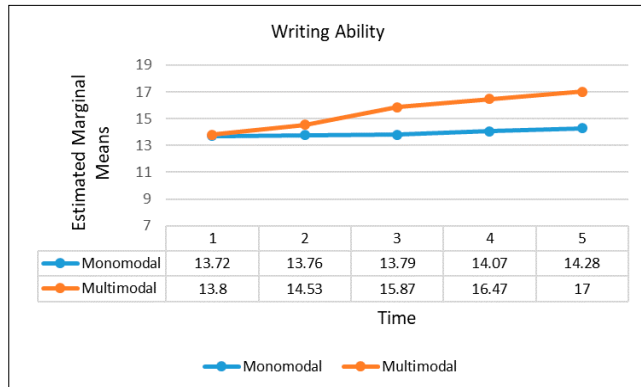
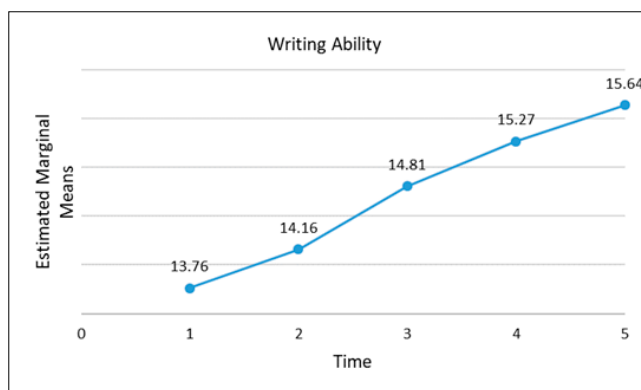


Figure 2 is also illustrative of the main effect of time on writing ability. As it is inferred, time played a great role in developing the writing ability. Simply put, the learners had improved writing ability across time.

Figure 2

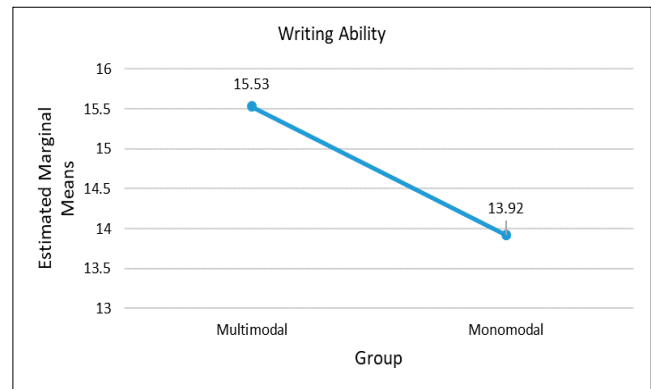
Writing Ability Scores with Respect to Time



Moreover, Figure 3 shows the main effect of the type of composition on the participants' writing performance across five times. As observed in this figure, the multimodal group outperformed the monomodal group in their writing ability.

Figure 3

Writing Ability Scores with Respect to Group



RQ2: Do multimodal and monomodal compositions affect writing ability components (content, communicative achievement, organization, and language) differently across time?

Concerning the writing ability subscales (content, communicative achievement, organization, and language), the researchers have reported the results of mixed between-within ANOVA in Tables 4 and 5. As illustrated, there was a significant interaction between time and content Wilks' Lambda = .750, $F(4, 54) = 4.57, p = .003, \eta^2_p = .08$ (large effect). There was also a considerable main effect for time, Wilks' Lambda = .300, $F(4, 54) = 31.15, p < .001, \eta^2_p = .32$ (large effect) with both groups showing an improvement in content scores across five times. The main effect concerning the two types of writing (multimodal/monomodal) was shown to be significant, too Wilks' Lambda = .750, $F(4, 54) = 4.57, p = .003, \eta^2_p = .18$ (large effect) admitting that there was a great difference between multimodal and monomodal groups with respect to content.

Regarding communicative achievement, there was a significant interaction between communicative achievement and time Wilks' Lambda = .590, $F(4, 54) = 9.22, p < .001, \eta^2_p = .40$ (large effect). No main effect was found for time Wilks' Lambda = .899, $F(4, 54) = 1.52, p = .200$ which supports time did not have any effect on communicative achievement. The main effect comparing the effectiveness of the two types of writing on communicative achievement subscale was not significant either Wilks' Lambda = .590, $F(4, 54) = 9.22, p < .001$ confirming that there was no significant difference between multimodal and monomodal groups in terms of their communicative achievement.

Concerning the organization component, there was a significant interaction between time and organization Wilks' Lambda = .550, $F(4, 54) = 11.12, p < .001, \eta^2_p = .15$ (large effect). A considerable main effect was obtained for time Wilks' Lambda = .480, $F(4, 54) = 14.50, p < .001, \eta^2_p = .18$ (large effect) with both groups showing an improvement in organization scores across five times. The main effect comparing organization subscale in multimodal and monomodal groups was significant Wilks' Lambda = .550, $F(4, 54) = 11.12, p < .001, \eta^2_p = .12$ (large effect) emphasizing that there was a significant difference in the effectiveness of DMC in developing organization component.

And finally, the effect of the two types of writing on language component across five times was

investigated and there was a significant interaction between time and language subscale Wilks' Lambda = .840, $F(4, 54) = 2.49, p = .050$, and $\eta^2_p = .05$ (medium effect). There was a substantial main effect for time Wilks' Lambda = .480, $F(4, 54) = 14.88, p < .001, \eta^2_p = .20$ (large effect) showing improved language scores across five times. The main effect for group was not significant Wilks' Lambda = .840, $F(4, 54) = 2.49, p = .050$ supporting that no difference was found between multimodal and monomodal groups in their language component.

Figure 4 provides the visual representation of writing ability components (content, communicative achievement, organization, and language) of both multimodal and monomodal groups across five times.

Table 4

Mixed Between-Within ANOVA for Writing Ability Subscales of Multimodal and Monomodal Groups across Time

<i>Effect</i>		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>P-Value</i>	<i>Partial Eta Squared</i>
Within-Subjects (C)	Time	17.29	3.27	5.29	26.20	.000	.32
	Time × Group	3.25	3.27	.99	4.92	.002	.08
Between-Subjects (C)	Group	26.67	1	26.67	12.31	.001	.18
Within-Subjects (CA)	Time	1.53	4	.38	1.93	.100	-
	Time × Group	9.11	4	2.28	11.49	.000	.40
Between-Subjects (CA)	Group	4.05	1	4.05	2.03	.200	-
Within-Subjects (O)	Time	10.59	4	2.65	12.53	.000	.18
	Time × Group	8.52	4	2.13	10.08	.000	.15
Between-Subjects (O)	Group	16.76	1	16.76	7.55	.008	.12
Within-Subjects (L)	Time	11.91	4	2.98	14.45	.000	.20
	Time × Group	2.20	4	.55	2.67	.030	.05
Between-Subjects (L)	Group	6.80	1	6.80	3.19	.080	-

Note: C = content; CA = communicative achievement; O = organization; L = language.

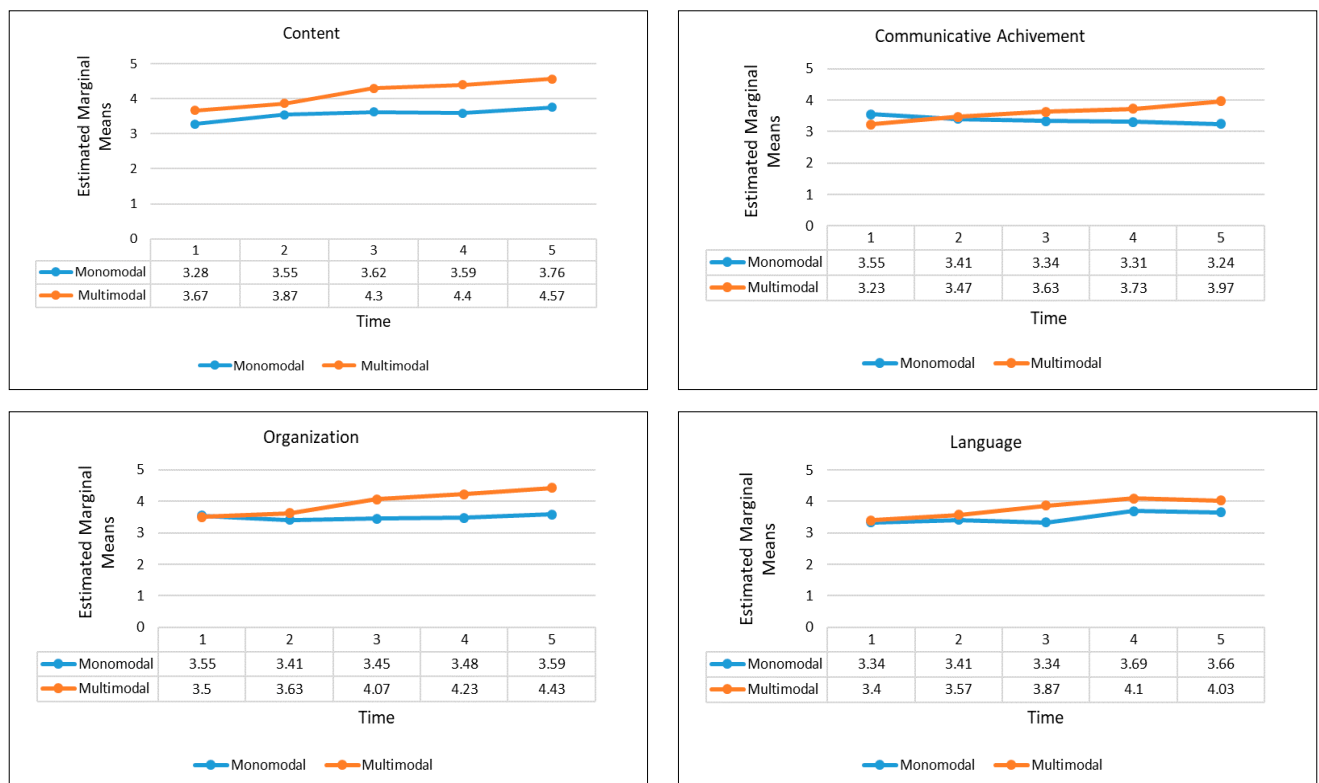
INTEGRATING DIGITAL MULTIMODAL COMPOSITION INTO EFL WRITING INSTRUCTION

Table 5
Multivariate Tests for Writing Ability Subscales

Effect	Multivariate	Value	F	Hypothesis	Error df	P-Value df
Time (C)	Wilks' Lambda	.300	31.15	4	54	.000
Time × Group (C)	Wilks' Lambda	.750	4.57	4	54	.003
Time (CA)	Wilks' Lambda	.899	1.52	4	54	.200
Time × Group (CA)	Wilks' Lambda	.590	9.22	4	54	.000
Time (O)	Wilks' Lambda	.480	14.50	4	54	.000
Time × Group (O)	Wilks' Lambda	.550	11.12	4	54	.000
Time (L)	Wilks' Lambda	.480	14.88	4	54	.000
Time × Group (L)	Wilks' Lambda	.840	2.49	4	54	.050

Note: C = content; CA = communicative achievement; O = organization; L = language.

Figure 4
Scores of Writing Ability Components of Multimodal and Monomodal Groups across Time



Discussion

This research investigated the differential impacts of the two types of composition (multimodal and monomodal) on the writing ability of Iranian EFL learners across five times. Firstly, it was hypothesized that multimodal writing had more differential effects on EFL learners' writing ability in terms of content, communicative achievement, organization, and language. As the results of the mixed between-within ANOVA revealed, the interaction effect between time and the type of writing was significant. That is, the impact of writing type on the writing ability was influenced by the amount of time spent on cause and effect writing tasks about health issues as well as social, educational, and environmental concerns.

In assessing the main effect of the type of writing on writing ability, the researchers came to the conclusion that DMC group who composed digitally outperformed the monomodal group in their writing ability in content and organization but not in communicative achievement and language subscales. The participants of both groups composed cause and effect essays and it seems that they could get a good grasp of content and organization subscales as they showed a better performance in using relevant content to inform their audience as well as organizing coherent texts using appropriate cohesive devices. On the contrary, they appeared less successful in the use of straightforward ideas, a wide range of lexis, and complex grammatical forms in their compositions. Therefore, the first research hypothesis was partially confirmed, as the DMC group did not outperform the monomodal group in communicative achievement and language. The global mean scores were higher and this proves the advantages of DMC. With respect to DMC group outperformance in content and organization components, the results corroborate with the findings by Kimmons, et al. (2017), Nobles and Paganucci (2015), and Vandommele et al. (2017) all claiming the superiority of the multimodal type of instruction over the monomodal one. This finding can be explained with regard to the affordances provided by the multimodal as compared to the monomodal instruction of writing. As multiple modes are provided to the learners, the process of meaning-making will be facilitated (Mayer, 2009; Mayer & Moreno, 2003) since the potential for cognitive processing will be activated based on the constructivist view of multimedia learning through which learning is constructed by the students' interaction with multimedia environments (Mayer, 2003).

Regarding the absence of multimodality impact on communicative achievement and language

components, the results are in line with Collins and Pascarella (2003) and Neuhauser (2002). One possible explanation for the lack of effect of composition type on communicative achievement may be the abstract concept of communicative achievement and the little familiarity of the participants with the appropriate register that the learners need to use in their writing tasks. As a matter of fact, content, organization, and language as the components of writing ability seem so tangible to the learners that they cope with manipulating them more easily than a concept as abstract as the register which rarely seems easy to them to perceive (Cambridge English Language Assessment, 2016). Besides, the absence of the effect of writing type on language subscale may be attributed to the complexity of the learners' interlanguage system (Selinker, 1992) that needs to be cognitively and progressively developed across time regardless of the type of composition to which the participants were exposed.

As the second hypothesis of the study, it was assumed that multimodal and monomodal writing affect writing ability components (content, communicative achievement, organization, and language) differently across time. Concerning the main effect of time, the researchers concluded that time played a critical role in developing the writing ability of both groups in three subscales of content, organization, and language in cause and effect essays. That is, the participants of both groups could improve their writing ability across time regardless of the type of modes they implemented in their writing. As a result, the second research hypothesis was also partially confirmed meaning that practice across time led to the improved writing ability in three subscales of content, organization, and language.

This finding lends support to the studies by Bae and Lee (2012) and Wang and Chen (2018) who reported that time factor had a crucial role in the development of the learners' writing output. One possible explanation for such a result may lie in the critical role of time in developing any skill. Specifically speaking, the more the participants practiced the linguistic, visual, and aural modes across time, the more they could achieve in the construction of their intended meaning. That is to say, the change in language learning starts from an initial state and develops across time based on the available resources. As learners practice writing across time, they get expertise to plan the content and form, consider audience and style, reread, and revise their compositions (Miller et al., 2008; Wind, 2013). Although the participants showed improvement in writing ability in three components of content,

organization, and language, the communicative achievement subscale was not influenced by the amount of practice the learners dealt with across time. This finding may be accounted for by the abstract nature of communicative achievement. As communicative achievement is defined as the ability to hold the target audience's attention effectively and to communicate straightforwardly, it seems that learners need more time and expertise to master this subscale (Cambridge English Language Assessment, 2016).

Though this study provides evidence that DMC plays a significant role in the development of writing ability, there are a number of limitations that need to be acknowledged and considered in future research. First, a major weakness resides in the small sample size ($N = 59$) which suggests caution in interpreting the results. Another caveat of the study derives from the fact that intact classes were used in the study; as a result, some variables related to the participants such as their aptitude, creativity, and engagement might not have been entirely taken into account. The study was also limited in not taking the teachers' role in multimodal writing instruction into account.

Conclusion

The present research was a significant endeavor which may contribute to a better understanding and implementation of the technologically-laden instruction of writing skill in Iran. As the findings revealed, the integration of innovative techniques such as DMC into writing instruction alongside continuous exposure and practice across time can lead to higher gains in writing ability. While it seems quite essential to train L2 writers to compose multimodally, they should also be reminded that digital composition is different from other informal writings they deal with electronically. Unlike informal digital writing such as texting, chatting, informal e-mailing, or video-making, digital composition requires its own framework like the appropriate use of grammar, mechanical conventions, unity, organization, cohesion, and coherence to which the learners' attention should be paid. Supporting the digital natives with the related instruction and sufficient practice in digital format together with familiarizing them with the typical errors specific to each mode can assist them in producing their best output.

From a practical point of view, there is a critical need to redefine the educational practices used so far to teach writing skill. First of all, the findings of the study may have beneficial implications for the teachers/professors of L2 writing. Handling the class

successfully with the technologically-based instruction seems an unquestionable skill for the twenty-first-century teachers who need to get well-informed about the innovative techniques of writing instruction via continuing professional development programs. Furthermore, the study seems useful to language learners. As language learners practice multimodality in contextualized writing assignments, they will broaden their view of writing and the more practice they do, the more mastery they achieve in going beyond the textual mode in their compositions. Curriculum developers and policy-makers may also benefit from the findings of the study by updating the curriculum of teaching English as a foreign language (TEFL) so that pre-service teachers get aware of the emerging technologies for writing instruction. And finally, the current findings add substantially to our understanding of the status of multimodal practices in Iran.

Since literacy in the twenty-first century means being able to communicate multimodally, it is recommended that future studies further our insight into the role of wikis, blogs, and social networks in the development of language skills and subskills such as listening, speaking, reading, writing, grammar, and vocabulary. Additionally, considering teachers' role in multimodal instruction of different language skills would be a very useful follow-up to the current study. As writing instruction is a multifaceted art and digital literacy is an emerging and popular discipline, an in-depth understanding of the potentials of multimodality can be one of the pre-requisites to the effective implementation of innovative pedagogical practices in an EFL situation like Iran.

Declaration of Competing Interest

None declared.

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Appendix

WRITING ASSESSMENT SCALE

<i>B2</i>	<i>Content</i>	<i>Communicative achievement</i>	<i>Organization</i>	<i>Language</i>
5	All content is relevant to the task. Target reader is fully informed.	Uses the conventions of the communicative task effectively to hold the target reader's attention and communicate straightforward and complex ideas, as appropriate.	Text is well-organized and coherent, using a variety of cohesive devices and organizational patterns, to generally good effect.	Uses a range of vocabulary, including less common lexis appropriately. Uses a range of simple and complex grammatical forms with control and flexibility. Occasional errors may be present but do not impede communication.
4	Performance shares features of bands 3 and 5.			
3	Minor irrelevances and/or omissions may be present. Target reader is on the whole informed.	Uses the conventions of the communicative task to hold the target reader's attention and communicate straightforward ideas.	Text is generally well-organized and coherent, using a variety of linking words and cohesive devices.	Uses a range of everyday vocabulary appropriately, with occasional inappropriate use of less common lexis. Uses a range of simple and some complex grammatical forms with a good degree of control. Errors do not impede communication.
2	Performance shares features of bands 1 and 3.			
1	Irrelevances and misinterpretation of task maybe present. Target reader is minimally informed.	Uses the conventions of the communicative tasks in generally appropriate ways to communicate straightforward ideas.	Text is connected and coherent, using basic linking words and a limited number of cohesive devices.	Uses everyday vocabulary generally appropriately, while occasionally overusing certain lexis. Uses simple grammatical forms with a good degree of control. While errors are noticeable, meaning can still be determined.
0	Content is totally irrelevant. Target reader is not informed.	Performance below band 1.		